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April 2009

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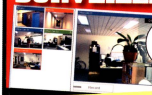


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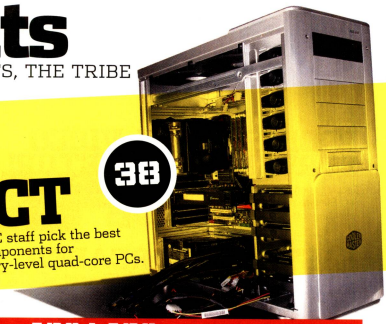
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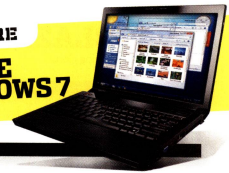
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06 editorial

TONY SARNO



THERE IS NO DOUBT THAT I AM USING THE TRUE SUCCESSOR TO XP

I've been using Windows *7* on one of my two production machines in the *APC* office. I realise that's a no-no but nothing forces you to get to know an OS more than putting it on a machine you depend on (a company-issue HP with a 1.86GHz Intel Core 2 6300 processor and 1GB of RAM; a classic corporate machine that could never run Vista). Windows *7* beta has some of the gloss of Vista, and is very fast. There is no doubt I am using the true successor to XP, and it shows that Microsoft can build a good OS.

It makes me wonder how Microsoft got it so wrong with Vista. Longhorn/Vista always struck me as a classic example of a product whose development was driven by the marketing and business departments, with the necessary focus on product engineering and quality being lost along the way. Jim Allchin, the product developer in charge of Vista, said as much when he expressed his frustrations in a memo to Bill Gates two years before Vista was released.

Allchin said: "I am not sure how the company lost sight of what matters to our customers (both business and home) the most, but in my view we lost our way. I think our teams lost sight of what bug-free means, what resilience means, what full scenarios mean, what security means, what performance means, how important current applications are, and really understanding what the most important problems [our] customers face are. I see lots of random features and some great vision, but that doesn't translate into great products. I would buy a Mac today if I was not working at Microsoft."

Two years later, we got Vista. When Microsoft put Steven Sinofsky in charge of Windows *7* it showed it had learnt its lesson. A software design engineer previously in charge of the boring but effective Microsoft Office, Sinofsky made massive changes to the Windows development group and demanded a product that demonstrably improved a consumer's experience. On the evidence so far, he seems to have cracked it.

tsarno@acpmagazines.com.au

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Bytesize
Mini news



UNIVERSAL CHARGER
How much time have you wasted trying to find the right charger for the mobile phones in your house? Incompatibility between phone charges promises to become a thing of the past now that 17 mobile handset manufacturers have agreed to move to a universal charging standard, based around the Micro USB interface. That's every major phone maker except for Apple, which will stay with its 30-pin Dock connector for the iPhone.

IFARTS EXPLOSION
The iFart iPhone app has set off an explosion of copycat farting apps that shows no sign of abating. There are now about 50, with names ranging from "Who Farted?" to "Mega Fart" and "Ultimate Fart Machine." Worse is to come as developers frantically work on emulating more bodily functions.

UNSHREDDER
Your shredding machine can no longer guarantee destruction of your paper documents. An Israeli company has released Unshredder: PC-based software that lets you scan in shredded strips so it can reconstruct them (and quickly too). It's revolutionising the private investigation industry.

Is it the end for plasma?
Body blow to plasma as Pioneer quits.

It's the equivalent of Ferrari or Rolls Royce quitting the car business. Japanese electronics manufacturer Pioneer's announcement that it's closing its HDTV division has come as a shock to videophiles and lays bare plasma TV technology's precarious future. Pioneer's plasma HDTVs are generally regarded as the best TVs, period. They are also the most expensive, selling between $5,000 and $10,000 depending on the model, yet Pioneer has been unable to run the division at a profit and sees no chance of that happening in the future. The global economic crisis has played a part, but so has competing LCD HDTV technology, which is improving by leaps and bounds. The latest LED backlit LCD TVs negate plasma's traditional advantages of black levels, contrasts and colour reproduction (and we won't even mention the still rare and amazing OLED LCD TVs released by Sony and Philips). Plasmas are also being singled out for their high energy use, with the European Commission reportedly drafting guidelines on TV power consumption that will make it harder to sell plasmas in Europe. Another maker, US-based Vizio has also quit the plasma business, and Hitachi has blamed major losses in its US division on falling sales of its plasma TVs. This now leaves just LG, Samsung and Panasonic as the remaining plasma producers.



TV OR NOT TV?
Will the financial crisis force producers out of business and spell the end for high-end gadgetry?

HOT PRODUCT

Powershot SX200 IS
Canon speeds the merger of digital cameras and camcorders.



It was only last August that Nikon made news by including 720p HD recording in its D90 DSLR. Now several camera makers, including Panasonic, Sony, JVC, Samsung and Canon have bundled HD recording into compact cameras. Canon's new mid-range compact, the PowerShot SX200 IS, comes with a 12.1-megapixel CCD and can record at 1,280 x 720 HD resolution. Should you want Full HD, it's available in the $899 PowerShot SX1, which records 1,920 x 1,080 movies at 30fps. The PowerShot SX200 IS retail price is yet to be announced but is expected to be around the $500 mark. Not bad for a camera and a camcorder in one.

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www.badongo.com

3 MEGAUPLOAD

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www.megaupload.com

4 A DRIVE

50GB on its basic free plan. Good file management.
www.adrive.com

5 SKYDRIVE

Microsoft's 25GB storage, integrated with Windows Live.
www.skydrive.live.com

6 HUMYO

10GB storage, drop files into a desktop window to upload.
www.humyo.com

7 MEGASHARES

10GB storage. Uploaded file can be up to 10GB in size.
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9 LIVE MESH

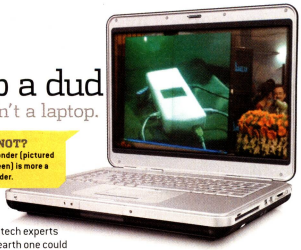
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India's $20 laptop a dud

The world's cheapest laptop isn't a laptop.



LAPTOP, OR NOT?
India's academic wonder (pictured on a real laptop screen) is more a glorified e-book reader.

Just as news came through that the One Laptop Per Child project is struggling because of manufacturers' unwillingness to produce it, an Indian university announced it was launching a $20 laptop.

The ultra-cheap laptop, called the Sakshat, was a project developed by the Vellore Institute of Technology and supported by the Indian Ministry of Human Resource Development as a way of ensuring universal access to technology for students of India's 18,000 colleges and 400 universities. The news of the Sakshat impending release generated massive interest around the world, particularly among tech experts wondering how on earth one could build a $20 laptop when some individual parts like a CPU would cost more than that.

But the official launch revealed the device to be less of a laptop and more a simple wireless internet access device with 2GB of memory. It had no keyboard or large screen. In fact, a working example of the device was not provided at the launch. The idea behind the cheap "laptop" was that students would log onto the net, download specific e-content and then view its contents by connecting it to a real laptop. A disappointed *Times of India* called it a "damp squib".

TELSTRA ADOPTS ANDROID

Android gets even more support.



SEE PAGE 27 for our review of the new Android-powered HTC smartphone.

T&A
Telstra set to deploy Android phones, with potential custom UI layer on top.

Telstra will release an Android smartphone on its Next G network in the second half of the year, a senior Telstra executive has told *APC*. Ross Fielding, Telstra's Executive Director of Product Management, also said Telstra would invest in writing software for the open source OS which would provide the smartphone with easy access to Telstra content and services.

"We invest a lot of money in our content and our services. For example, we have our own consumer email offering, so we don't want a phone that's tied to a certain service and tells the customer 'you have to have this'," Fielding said.

"We have to make sure the handset supports Telstra services as well as the other things. The first versions (of HTC Android phones) were tied to Gmail, and that's not our strategy."

Asked if this meant Telstra would write its own Linux software or a customised UI layer, Fielding said that "that's the most logical thing to do — you'd build something on top of it. So that's the development path we'll go down."

However, while Fielding says he has seen HTC's second-gen Magic Android handset, there was no guarantee that HTC would get the nod. "We're partners with HTC, but we'll be talking to all of our many partners".

David Flynn

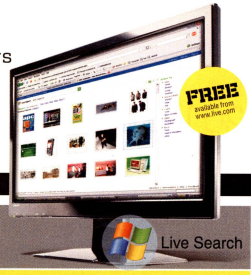
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HEAD2HEAD

Microsoft claims Live Search is now the equal of, if not better than, Google. We put the claim to the test, searching for "*APC* magazine".





	MICROSOFT LIVE SEARCH	GOOGLE SEARCH
Search returns	Live Search returns 14,900,000 instances of "*APC* magazine". That's just too many to be useful.	Google returns only 48,200 instances, which appear more targeted (see next row).
Search quality	The initial page of results produced some puzzling links, such as two mentions of *APC* on a local blog.	Google's algorithm returns the mentions we'd expect, with most links relating to *APC* and mentions on popular sites.
Image search	Live's image search is more like an application, with a sophisticated UI and search refinement criteria such as aspect ratios, colour, style, even faces.	Google's image search is looking dated and clumsy, and requires too many clicks to get the job done. Live Search blows it away.
Maps	Click Maps for "*APC* magazine" and we get a "find a map" dialog box pre-filled with *APC* Magazine in the UK. Huh?	Google returns a link to our magazine with our full address and phone number, and a Google Maps of our building.
Verdict	Live Search has a smashing image search, but falls down on the basics of search and integration.	Google remains the superior search engine, but needs to smarten up its image search.

DATA STASH FOUND

Researchers discover 'dropzones' with gigabytes of stolen data.

What happens to the credentials stolen by keyloggers? Researchers at the Laboratory of Dependable Systems at the University of Mannheim in Germany (**www.tinyurl.com/43kjvz**) have found a network of sites called a 'dropzone': the digital equivalent of the dead letterbox technique used by spies. "In [a keylogger] attack, the attacker uses phishing emails as an attack channel and lures the victim into revealing his credentials at a bogus site. These credentials are then sent to the attacker using the harvesting channel," says report co-author Thorsten Holz.

Using CWSandbox (**www.cwsandbox.org**), Holz and colleagues studied more than 2,000 keyloggers. They discovered a total of 3,545 sites forming distinct dropzones. The amount of data these held should leave no-one in any doubt that keylogging is a serious security threat. Researchers discovered 33GB of data relating to 170,000 victims, including 149,000 sets of credit card details, 10,700 bank account details and 5,712 eBay credentials, all with low resale prices.

"Keylogging is one of the simplest forms of theft, deployed via a trojan on an infected PC," confirmed Jordan Chambers of UK-based Metasec security assessment company (**www.metasec.co.uk**). "Anyone not defending their PC is susceptible to these kinds of infections. Through keyloggers, the hacker knows whether you've visited banking sites and knows what to do with the information... It is vital that AV software and your firewall are kept up to date. One keylogger on your PC and everything you access online is at risk."



Cloak and dagger: uncovered keylogger data stashes reveal the breadth and depth of this ongoing security threat.

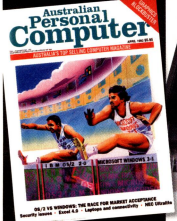
NUMBER CRUNCHING

180,000,000
Copies of Windows Vista shipped so far
source: Microsoft

177,000,000
The number of registered internet domains in 2008
source: Verisign

361,000,000
The number of global internet users in 2008
source: Internet world stats

THE (A)PC REVOLUTION
APR / 1992



THE NEXT (AND LAST?) MODEM STANDARD

Today's fastest V.32bis 9,600bit/s modems are whirlwinds compared with the 1,200 and 2,400bit/s modems that have long been standards. But tomorrow's modems promise even higher speeds. Until the CCITT committee finalises the V.Fast standard, we won't know for sure what speeds it will support but it seems the upper limit will be at least 24,000bit/s and might even be 28,400bit/s (113,000 bit/s with compression) over common telephone lines.

REVAMPED IBM EXPANDS RANGE

Determined to put last year's disastrous financial performance behind it, IBM Australia's new look Personal Systems division has strengthened its workstation and notebook offerings and reduced prices across the board. IBM's PS/2 CL57 SX notebook features an active matrix thin-film transistor display, is powered by a 20MHz i386SX processor and includes an 80MB hard disk and 1.44 floppy drive. It weighs 5kg and costs just $10,950.



7 ON THE VISTA?
Windows 7 not too far away, but 'six' versions (and business OS timing) set to complicate matters.

WINDOWS 7 OUT LATE '09

Windows 7 could be out in six editions — and sooner than you think.

There are several signs Microsoft's next operating system will be released this year, starting with a Microsoft executive's revelation in a podcast last month that Windows 7 will be sent to manufacture exactly three years after Vista, which would make it October this year. The announcement that Windows 7 will be available in six versions also smacks of priming the market, although the multiple versions have not gone down well with many potential customers who think MS has not learnt its lessons from Vista's multiple-version confusion.

The Windows 7 beta that was distributed earlier this year is said to be code complete and seems to be working without significant dramas, in stark contrast to the problems suffered by the commercial version of Vista when it was released three years ago. Though copies of it will be on the torrent sites, the Windows 7 beta is now no longer available officially from Microsoft. Redmond has said that there may not be another beta, the next version being the Release Candidate which is now thought to be already with some official beta testers.

And if Microsoft needed more motivation to get Windows 7 out early, it's that corporations whose natural technology upgrade cycle would now see them move to Vista, are now saying they will hang back and wait for Windows 7, even if many will move only when the first service pack for Windows 7 arrives and Microsoft ends general support for XP in April.

This has prompted the head of Product Management for Windows Client, Gavriella Schuster to warn those waiting for Windows 7 that: "You may find your company in situations where applications are no longer supported on Windows XP and not yet supported on Windows 7.

"You will want to take time to evaluate Windows 7 just as you evaluate any new operating system for your environment prior to deployment. As Windows 7 is planned to be released about three years after Windows Vista, the total period that many customers will likely be waiting prior to deploying Windows 7 in their environment will likely be in the range of five years after Windows Vista's release."

Mustknow
Essential Knowledge

WHY HARD DISK FAILURES ARE UNPREDICTABLE

John Elerath, a hard drive engineering expert with Network Appliance, explains that all mean times between failures tend to disagree with the manufacturers' specs: "More disconcerting is the realisation that the failure rates are rarely constant; there are significant differences across suppliers, and great differences within a specific HDD family from a single supplier. These inconsistencies are further complicated by unexpected and uncontrolled lot-to-lot differences. In a population of HDDs that are all the same model from a single manufacturer, there can be statistically significant subpopulations, each having a different time-to-failure distribution. Analyses of HDD data indicate these subpopulations are so different that they should not be grouped together for analyses because the failure causes and modes are different. HDDs are a tech that defies the idea of "average" failure rate or MTBF. Inconsistency is synonymous with variability and unpredictability." Read the full piece at *tinyurl.com/cta37l*.

Topsite
URL of the month

NICE TRANSLATOR

If you need to translate something into several languages quickly, the Nice Translator web site will do it for you. Pick the languages, type it into the text box, and the translations will appear simultaneously on the page. For anyone who needs to translate technical documents into several languages, this could be a godsend.

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FACT FILE

Toshiba's new Qosmio X305-Q708 laptop features three GPUs: a GeForce 9400M and two GeForce 9800M GTS chips. "It uses one GPU for normal things like word processing and email," explains Dan Vivoli, senior vice-president of marketing at NVIDIA. "Then it kicks in with the double GPU for gaming and video playback."

WILL YOUR NEXT CPU BE A GPU?

Will a GPU give your PC a huge speed boost, or is GPGPU computing just another passing phase? **Dean Evans** investigates.

Everybody's talking about supercomputing on the desktop — and in particular, whether it will be GPUs that achieve that goal. It's been said that general-purpose computation on GPUs (an idea known as the GPGPU) might be the most important computing trend over the next 10 years. As claims go, it's a biggie. But if you want proof of the industry's faith in the concept, just take a look at who wants a slice of the GPGPU pie: NVIDIA, AMD, Intel, Microsoft, IBM, Apple and Toshiba all want in.

The GPGPU concept enables the GPU to moonlight as a versatile co-processor. As NVIDIA's David Luebke has suggested, computers are no longer getting faster; the move to multicore processors means they're actually getting wider. That's the idea that GPGPU computing cashes in on. By intelligently offloading data-intensive tasks from the CPU to other processor cores (such as those in a graphics card), developers achieve improved application performance through parallelism.

What sort of impact will this have on a desktop PC beyond gaming applications?

Recently, we've seen the potential for faster media encoding with the release of Badaboom. Ripping a DVD or converting a video file would typically monopolise a CPU-only system. Built with NVIDIA's CUDA language, Badaboom allocates this data-intensive workload to an NVIDIA GPU so that the CPU can still be used for day-to-day tasks.

Adobe's Photoshop CS4 has been optimised to offload certain tasks to any Shader 3.0-compatible GPU. The filters in Photoshop aren't that different from pixel shaders. A traditional CPU will apply each filter sequentially so that images take several seconds to re-render. Using the parallel architecture of a GPU, filters can be applied to an image in real-time to provide instant results. Photoshop CS4 uses OpenGL and GPU acceleration to improve zooming, rotation and transitions at all display levels. Colour matching has also been shunted to the graphics chip. You don't lose any features by not having a compatible GPU, but, as Adobe's senior vice-president John Nack points out, a PC with a good graphics card "will blow away computers that don't have one."

Cyberlink's PowerDirector 7 software promises "up to five times faster video previewing and rendering performance" with the help of GPU resources. However, as with Photoshop CS4, this extra power only really comes into play when applied to advanced effects. S3 Graphics, meanwhile, has announced the release of S3FotoPro, an imaging application that uses the GPGPU potential of its Chrome 400/500 chips. According to S3 Graphics, S3FotoPro uses smart-image algorithms running on the GPU to "analyse and automatically adjust macro and micro details within a picture to enhance the picture quality". Available picture enhancements include colour clarity and correction, de-fogging, skin smoothing, gradient blending and saturation and tonal balance adjustments and optimisations.

"With support for the latest GPGPU applications and languages, S3FotoPro provides a highly useful and versatile tool for end-users and our partners," says Michael Shiuan, VP of

TOOLS OF THE TRADE

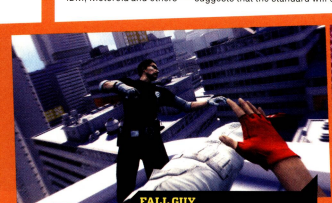
WHY NVIDIA'S CUDA IS UNDER THREAT FROM APPLE'S INDUSTRY-STANDARD OPENCL INITIATIVE.

Developing the tools and the algorithms to get the best out of GPGPU technology is a huge challenge. Applications will need to be restructured and recoded with multicore systems in mind. There are already several programming languages available for the job, most notably NVIDIA's C-based CUDA. But like any new frontier, GPGPU programming is a lawless place. AMD has its own CAL/Brook+ SDK, while Microsoft is developing its own Compute Shader for DirectX 11 to gain access to GPU resources.

While the existence of multiple GPU languages will help to tie developers down to individual hardware, it's not ideal for the consumer or the fledgling GPGPU market. That's why Apple is leading the charge for an industry standard GPGPU toolset: OpenCL.

"OpenCL's ultimate purpose is broader than just GPGPU," says computing web site HPCwire. "Its real goal is to define a standard low-level API for a whole range of parallel architectures, including GPUs, multicore CPUs, the Cell processor, Larrabee and DSPs. In fact, OpenCL stands for Open Computing Language, which is about as broad as it gets. The fact that the OpenCL working group includes the biggest players in chip making — Intel, AMD, NVIDIA, IBM, Motorola and others — suggests that the standard will enjoy broad industry support."





FALL GUY
NVIDIA's GPUs use Ageia's PhysX code libraries to calculate real-time gravity and inertia effects in games such as Mirror's Edge.



HARD CORE
AMD's 4800 series Radeon HD cards feature 800 programmable cores that can be used for data crunching.



REAL-TIME
The GPU may be able to deliver high quality real-time ray-traced graphics with previously unseen image quality in the future.

Hardware Engineering at S3 Graphics. "Application processes that required days to complete can now be completed in seconds using a GPGPU product like ours."

THE GPGPU PROBLEM

Though GPUs are extremely efficient at streaming and processing data, most PC apps are serial in nature. A GPU can't turbocharge your word processor, for example, or speed up your antivirus package.

"One of the reasons GPU designers can deliver huge peak performance numbers is that they've greatly constrained the architecture," says Anwar Ghuloum, a principal engineer with Intel's Microprocessor Technology Lab. "What this means is that they can design more efficient processors by not dealing with the messy, irregular patterns of computation that most applications inevitably deal with. These include looping conditions, unpredictable branches and irregular memory access patterns." Read more on Ghuloum's blog at **www.tinyurl.com/4eqr3l**.

GPUs excel at data parallelism because they have lots of maths units and fast access to onboard memory. They also achieve a high throughput on parallel tasks because programs can be executed on each shader core. However, CPUs still rule the roost as far as task parallelism is concerned because their fast caches enable efficient data retention and they can handle branching. CPUs can achieve high performance on a single thread. In other words, the processors complement each other.

To get the most out of this CPU/GPU partnership in the future, developers will need to change the way that applications are coded. That's where programming languages such as CUDA and OpenCL come in.

We've yet to see the best of what GPGPU computation has to offer. The programmability of GPU cores could make real-time ray tracing a possibility, while the concept of GPU-accelerated storage could allow PCs to encrypt and compress files on the fly. And the GPGPU concept isn't restricted to desktop systems and workstations, either. There's scope for multiple processing on mobile devices too.

AN ALTERNATIVE FUTURE

Another possible scenario is that current GPGPU initiatives are just a stop-gap measure until CPU and GPU platforms converge. In a recent interview with web site Ars Technica, Epic Games' co-founder Tim Sweeney suggested that: "In the next console generation, consoles could consist of a single non-commodity chip. It could be a general processor that has evolved from a past CPU architecture or GPU architecture, and it could potentially run everything in an entirely homogeneous manner. That's a very interesting prospect because it could dramatically simplify the toolset and the processes for creating software."

This sounds a little like Intel's Larrabee project, which is due for release in early 2010. So perhaps a dramatic change in processor architecture isn't as far away as some people might think. One thing's for sure, though: don't count the GPU out just yet.

14 epinions
HAVE YOUR SAY

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THIS ISSUE'S WINNER

Stephen wins a TP-Link Wireless N Router and Adapter bundle worth over $200.



Letter of the month

OPTICAL DEAD END

The days of optical media are numbered. Sure we have DVDs being replaced by the new Blu-ray format but Blu-ray hasn't caught on yet and I'm not sure that it ever will. Why? Because people are sick of scratched optical media and disc rot.

People have been abandoning buying music on CD after discovering the convenience of purchasing music online. I believe that just as people now buy music online, they will switch to buying movies online.

However there is a catch: the exorbitant prices Australians have to pay for broadband compared to users in other countries. For instance, Telstra has released a new 'World's Fastest' broadband plan. Sounds very nice except there is a download quota of 1GB a month for a $59 plan.

You may be able to download a movie in a very short time at that speed but that's barely one movie in a compressed format: forget HD.

Even the best plans offered by most ISPs would be insufficient for downloading more than a few movies in a month at decent quality. I oppose piracy in all its forms, but film distributors are unable to offer a viable legal alternative to movie downloads until Australian ISPs move beyond the restrictive plans and quotas that are in place now.

Stephen O'Neil
Morley, WA

Windows 7's approaching release means we don't want to hear any more about Vista, please, say some APC readers.

WINDOWS 7

What was the point of getting James Bannan to review Windows 7? In the past he has constantly promoted Vista even though it is an unnecessary change with serious compatibility flaws. Now he begins his review by telling us we are all petulant because we didn't dump a proven mature product like XP. I want to like Windows 7 but I need a more independent source (such as **choice.com.au**) to compare Windows 7 and XP.

Chris Pile
Amaroo, ACT

VISTA NEVER DIES

What is it with James Bannan and Windows Vista? Even when reviewing Windows 7, he can't bring himself to condemn the Vista clusterf--- that it replaces. In fact, he characterises our rejection of Vista as "petulant" and then later in the article goes on to suggest that migrating to Vista would be a good thing. Yeah right, James, we'll all migrate now from XP to Vista so that we can again migrate in a few months when Windows 7 is released. Surely even Microsoft would want James to embrace Windows 7 and move on from the bad dream that is Vista.

Alan Johnson
Sydney, NSW

SPECS DEFECTS

After reading your Watchdog article in the March 09 edition titled "Feature bloat angers developer" I felt compelled to respond. As a professional software tester I regularly raise defects with developers when they have not followed the specs, and while the developers often complain about my defects they usually accept that they haven't followed the specs and fix the errors. But I hear the most noise when I raise defects that originate from badly written specifications, because specification writers (usually BAs) seem to think that specifications can't have defects. This is exacerbated by the fact that many projects don't bring in any testers until after the code is already 60-90% complete and then run horribly over budget when a defect is found in the specifications that causes a complete rewrite.

This Watchdog is a perfect example of this situation. John should have employed someone to test his specifications before delivering them to the developer. I would also like to praise the developer's staff for their dedication to following the specification exactly; it is rare to find such passionate developers and there should be more like them.

Dave
Tingalpa, Qld

AUDIO COPIES

I read your suggestion for making MP3 audio copies of YouTube videos (*APC* February, page 72). I have

apc



FEELING INSECURE?
Our recent wrap-up of free vs. cost security products left some security vendors feeling... well, insecure.

SECURITY

I was interested in reading your article in the February issue "PC Security: Free or Fee?" It confirmed my belief and was reassuring to know that the free versions can be as good as the commercial products. Although I thought it was brave of you to "Highly Recommend" Trend Micro when it failed to detect the virus. I was wondering if you tested AVG, as it's on the DVD, and if so how it went.

Kellie Massey
Melbourne, Vic

[Editor replies: that was one of the most controversial stories we have run in recent times because it incensed the commercial antivirus vendors. As part of my job I keep trying new antivirus programs and have to admit that the free programs are pretty good at protecting my home machines, and far more convenient without all the subscription hassles of commercial programs. Still, the commercial programs tend to give you a wider umbrella of defences and far more frequent antivirus updates. My work machines are protected with commercial programs such as Norton and Kaspersky, my home ones with AVG.]

been using an alternative system which you (and your readers) might find useful.

My technique involves the use of Audacity (although you could probably use any similar audio capture/edit software). Firstly, from Control Panel I set the source of recording to my sound card. I then open Audacity and also YouTube via a web browser. When I have located a clip that I would like saved as an audio file I simply start recording a new file in Audacity and then play the clip in YouTube. When the recording is complete I save the file (usually in MP3 format). I then re-open the file in Audacity and edit it to trim the lead in and end sections so that I have just the section that I want. Simple as that.

Phil Browne
Woodend, Vic

BETTER WI-FI

Why don't laptop/netbook manufacturers terminate their internal Wi-Fi antennas in an external RP-SMA connector? This would allow the user to connect an external antenna to their computer in areas of low signal strength. I envisage the connector being built in to the screen surround so that when the computer is open the external antenna would simply stick up higher than the screen top. Alternatively, there are some antennas available that have a length of cable attached so that they can be put even higher.

Tony Moloney
Merriwa, WA

BLEEDIN' OBVIOUS

Yes, I'm running Vista. Not because I like it, nor particularly that I like pain, but due to the fact that as I support others, I need to. So it's been set up to "Automagicly" update as needed. Now I know I am a glutton for punishment, but I have been using Internet Explorer 8 beta (it's called beta because that way Microsoft can mess with people's minds when software doesn't work as expected).

This great program now works very well except for a gotcha. It does not display images on a web site out of the box. A great security feature of course, but useless for someone who doesn't give a scrap for user-unfriendly settings. After researching by using Google (Live view creates more questions than answers when asked) I found that Show Pictures had been turned off by default. What the heck?

Jon Vance
Melbourne, Vic

[Ed replies: IE8's default turning off of Show Pictures happened to an APC staffer as well, and we spent hours trying to find the problem, never imagining a browser would be issued with pictures turned off. However this appears to have been fixed in the latest IE8 beta.]

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APC magazine is published by ACP Magazines – a division of PBL Media Pty Limited

ACP

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Not a liar, not right either

APC reader John Summerfield has provided tech support to everyone from programmers to teachers and students. He writes in after reading the March edition of *APC*, in which techie Jonathon Warren found that sometimes HP tech support staff didn't believe the diagnosis of problems that Warren provided them. Summerfield, from Greenmount, WA, says: "Let me put another perspective on Jonathon's problems. When the programmers at the Department of Social Security had a problem with the mainframes that they could not resolve, they called me. It's been my experience, then and since, that when users call for help they generally do not properly understand the problem. They are not liars, though I jokingly have said to some of them, 'All programmers are liars.'"



WHAT REALLY HAPPENS

In order to solve problems, I have to rely (whenever possible) on my own observations. This does not mean I don't listen to what they see and what they think is the problem. Let's look at some typical problem descriptions at a school where I work now.

1. "The internet is down." Mostly, this is The Boss, and the resolution is to cycle power on the Airport (Apple access point).

2. "The printer doesn't work". Mostly the resolution is the same as for 1.

3. "The icons have vanished." Icons? Those pretty print, open, close etc. buttons on Word had gone missing — a couple of mouse clicks and the menu bar was restored.

4. "I can send email from my laptop, but not from the staff computer." Turned out she couldn't spell her own email address, so she didn't get a bounce message either.

5. "Why doesn't sound work on this new ruddy computer?" I adjusted the volume. To be fair, the teachers' laptops are Apples; the students' computers nice new HP SFF desktops with Windows XP Professional.

In the particular case of HP, (and Microsoft and probably every other major business with any competence), as far as I can tell, they're using support staff like trained monkeys for first-level support, so the staff have a script to follow. It might seem simple and it might be tedious, but it's designed to solve most problems.

If the problem description begins, "My computer does not work," expect to be asked: "What do you mean, 'It does not work? Does the power light come on?'" And 'Is the power cord plugged firmly into the wall and into the computer?' And 'Is the power turned on?' And 'How have you tested to see that the power point works?' and so on.

It might sound simple, and you might think we're treating you like an idiot, but we got a call for support like the one here a few months ago saying that the (USB) printer didn't work. Well, on investigation, it didn't work because its cable was plugged into an RJ45 connector.

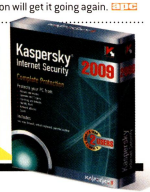
If the HP front-line support trusted Jonathon's judgment, they'd be doing their job very poorly. Even if they thought Jonathon was telling the truth, that truth was not confirmed by his own observations.

Trust me on this: HP does not want to send someone out to fix your printer if it's not broken, and neither do you. The quickest way to return it to service is to get a good (in HP's view) diagnosis on the problem in the hopes some user action will get it going again. ETC

I'LL FIX IT!
Sometimes, problems are best left to the professionals. (That's *sometimes*.)

WINNERS GET THIS

Kaspersky Internet Security 2009 for three PCs (packaged in a retail box) includes intelligent application management and control tools, proactive protection from unknown threats, automatic disabling of links to malware sites — and even scans operating systems and applications for vulnerabilities. The software also provides a range of identity theft and content filtering applications designed to ensure users remain protected online. This prize is a one-year subscription valued at $99.95.
www.kaspersky.com.au





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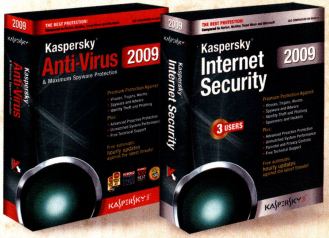
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or at your local computer retailer



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watchdog

KEEPING AN EYE ON VENDORS!



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When the price is changed on you

Advertising a product for a certain price and then changing it once the customer has made the purchase is wrong, right?

When you buy something from a bricks and mortar store, you pay your money and you walk out with the goods. When you buy something online, you might get a better price, but all kinds of things can go wrong while you wait for the goods to arrive. An increasingly popular practice is for the online seller to change the price on you before delivery, or not deliver the item (and offer a replacement you don't want).

In February's Watchdog, we wrote about reader Raymond Clarke, who bought a digital tuner from online retailer Bandit Technology, only to be told afterwards (before his credit card was charged) that the price had risen by $5. We printed a response from Bandit Technology which basically said that its terms and conditions stated it could change the price after making a sale (but before charging the customer's credit card) for any number of reasons, including price changes by its suppliers.

And, this month, another reader, Bill Spiteri, wrote to say he'd ordered two 250GB HP hard drives from the A03 Computer Search Company web site. "I paid by direct debit for the goods plus delivery. The drives were in stock and at $556 each. I rang three times and asked when I would be getting them and finally received an email advising me that they were not in stock, delivery was 21 days and the cost was now $628. The email asked what I would like to do. I emailed back and said as I needed them in 7 days I would cancel the order. I then received an email advising that I would be charged a 20% fee for order cancellation."

The issue seems clear cut. Reader orders product based on advertised price and is later told price has changed. Shouldn't the seller be bound to deliver goods at the original price? This is what another *APC* reader, Bob Liddelow, asked when he wrote in to criticise *APC*'s handling of the Clarke complaint, saying we'd just let Bandit have its say without following it up with an opinion on the validity of the initial contract that had established between the buyer and seller. "A binding contract exists at the original price from the time that there was acceptance by the buyer of the offer to sell in the online sales site and that the price is that included in that contract. The seller cannot back out of the price," he said.

Stands to reason, right? No. Sellers can change the price if this is covered by their terms and conditions. We asked the NSW Office of Fair Trading: "Can a vendor change the price that a consumer has agreed to buy? Seems that they get people to commit to a purchase, delay delivery, and then hit them with a higher price?"

NSW OFFICE OF FAIR TRADING:

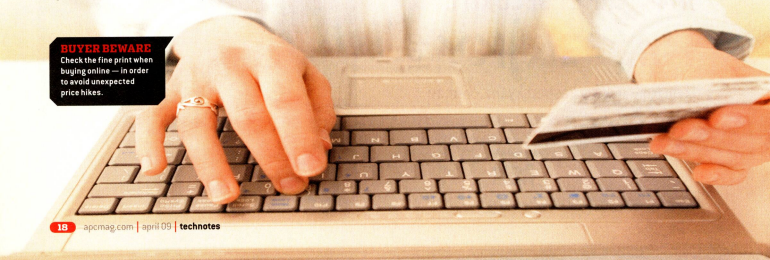
"This depends on the terms of any contract the consumer might have entered into. If there was a term that allowed a variation in price after placing an order, this may allow the company to take this action. However, if no such term exits and the consumer enters the contract on the basis of the price advertised for the goods, the price should apply.

"Regarding Bandit Technology, as the goods were ordered but the credit card purchase was not processed, no transaction took place. Information on the trader's web site provides 'Conditions of Use' and the process re: ordering, price, stock availability and the confirmation email listing the price to be paid."

Watchdog also asked about the case with the A03 Computer Search Company. The OFT replied:

"The consumer has made a formal complaint to OFT and this matter is currently being examined."

The NSW Office of Fair Trading also asked that readers should come forward with any complaints to their local consumer protection agency. ATTC



BUYER BEWARE
Check the fine print when buying online — in order to avoid unexpected price hikes.

GO WITH GEFORCE!

Make NVIDIA GeForce your next GPU of choice and be guaranteed to fully enjoy the beauty and seamlessness of Windows Vista and all of the hottest game titles of 2008 and 2009 powered by Microsoft's DirectX 10 technology. Whatever GeForce you choose, NVIDIA will always make it easy to tap into your card's full capabilities thanks to a Unified Driver Architecture, making full use of PhysX and SLI technologies wherever features are supported and detected. And it doesn't stop at providing greater realism through refining the smaller details as NVIDIA gives you the bigger picture when you start playing your games on Extreme HD resolutions. And it all starts with choosing your very own GeForce GPU.

SETTING THE PERFORMANCE BAR
GeForce 9800 GTX+



Extreme HD gaming and first class entertainment experience covered by unmatched price-performance value.

SPECIFICATIONS • 128 Stream Processing Cores • 1,836MHz Processor Speed • 738MHz GPU Speed • 512MB GDDR3 Memory • 256-bit Memory Interface • 1,100MHz Memory Speed

SPECIAL FEATURES

Dual / 3-Way SLI Ready | GeForce 3D Vision Ready | NVIDIA PureVideo HD Technology | NVIDIA PhysX Ready | NVIDIA CUDA Technology | DirectX 10 / OpenGL 2.1 Support | HybridPower Support

STEPPING INTO HIGH-END GAMING
GeForce 9800 GT

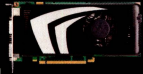


SPECIFICATIONS • 112 Stream Processing Cores • 1,500MHz Processor Speed • 600MHz GPU Speed • 512MB GDDR3 Memory • 256-bit Memory Interface • 900MHz Memory Speed

SPECIAL FEATURES

Dual SLI Ready | GeForce 3D Vision Ready | NVIDIA PureVideo HD Technology | NVIDIA PhysX Ready | NVIDIA CUDA Technology | DirectX 10 / OpenGL 2.1 Support | HybridPower Support

BIG ON PERFORMANCE, LIGHT ON THE WALLET
GeForce 9600 GT



SPECIFICATIONS • 64 Stream Processing Cores • 1,625MHz Processor Speed • 650MHz GPU Speed • 512MB GDDR3 Memory • 256-bit Memory Interface • 900MHz Memory Speed

SPECIAL FEATURES

Dual / 3-Way SLI Ready | GeForce 3D Vision Ready | NVIDIA PureVideo HD Technology | NVIDIA PhysX Ready | NVIDIA CUDA Technology | DirectX 10 / OpenGL 2.1 Support

GEFORCE MUSCLE FOR THE MASSES
GeForce 9500 GT



SPECIFICATIONS • 32 Stream Processing Cores • 1,400MHz Processor Speed • 550MHz GPU Speed • 256 to 512MB GDDR2/GDDR3 Memory • 128-bit Memory Interface • 500MHz/800MHz (GDDR2/GDDR3) Memory Speed

SPECIAL FEATURES

Dual SLI Ready | NVIDIA PureVideo HD Technology | NVIDIA PhysX Ready | NVIDIA CUDA Technology | DirectX 10 / OpenGL 2.1 Support

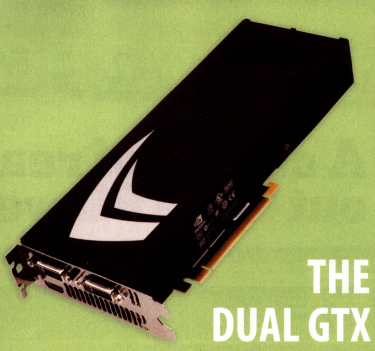
THE INTRODUCTORY GEFORCE EXPERIENCE
GeForce 9400 GT



SPECIFICATIONS • 16 Stream Processing Cores • 1,400MHz Processor Speed • 550MHz GPU Speed • 128 to 512MB GDDR2/GDDR3 Memory • 128-bit Memory Interface • 400MHz Memory Speed

SPECIAL FEATURES

NVIDIA PureVideo HD Technology | NVIDIA PhysX Ready | NVIDIA CUDA Technology | DirectX 10 / OpenGL 2.1 Support



THE DUAL GTX BEAST IS HERE!

GeForce GTX 295

SPECIAL FEATURES

Quad SLI Ready | GeForce 3D Vision Ready | NVIDIA PureVideo HD Technology | NVIDIA CUDA Technology | DirectX 10 / OpenGL 2.1 Support | NVIDIA PhysX Ready

The only choice of the top players and hardcore enthusiasts, from the top guns to the supreme commanders to the next Picassos and James Camerons.

SPECIFICATIONS • 480 Stream Processing Cores • (240 per GPU) • 1,242MHz Processor Speed • 576MHz GPU Speed • 1792MB GDDR3 Memory • 896-bit Memory Interface • 999MHz Memory Speed

FOR GAMING AND BEYOND
GeForce GTX 285



The world's most powerful single GPU on the planet, now available.

SPECIFICATIONS • 240 Stream Processing Cores • 1,467MHz Processor Speed • 648MHz GPU Speed • 1,024MB GDDR3 Memory • 512-bit Memory Interface • 1,242MHz Memory Speed

SPECIAL FEATURES

Dual / 3-Way SLI Ready | GeForce 3D Vision Ready | NVIDIA PureVideo HD Technology | NVIDIA CUDA Technology | NVIDIA PhysX Technology | DirectX 10 / OpenGL 2.1 Support

ABSOLUTE PERFORMANCE
GeForce GTX 280



Fully immersive gaming and high definition video viewing pleasure, guaranteed.

SPECIFICATIONS • 240 Stream Processing Cores • 1,296MHz Processor Speed • 602MHz GPU Speed • 1,024MB GDDR3 Memory • 512-bit Memory Interface • 1,107MHz Memory Speed

SPECIAL FEATURES

Dual / 3-Way SLI Ready | GeForce 3D Vision Ready | NVIDIA PureVideo HD Technology | NVIDIA PhysX Ready | NVIDIA CUDA Technology | NVIDIA PhysX Technology | DirectX 10 / OpenGL 2.1 Support | HybridPower Support

TOP TIER SATISFACTION
GeForce GTX 260

The first of NVIDIA's next generation GeForce GPUs, built for the demanding gamer.

SPECIFICATIONS • 192 Stream Processing Cores • 1,242MHz Processor Speed • 576MHz GPU Speed • 896MB GDDR3 Memory • 448-bit Memory Interface • 999MHz Memory Speed

SPECIAL FEATURES

Dual / 3-Way SLI Ready | GeForce 3D Vision Ready | NVIDIA PureVideo HD Technology | NVIDIA PhysX Ready | NVIDIA CUDA Technology | NVIDIA PhysX Technology | DirectX 10 / OpenGL 2.1 Support | HybridPower Support

WWW.APCMAG.COM

A couple of reasons to check out the APC web site. . .



Tech news as it happens

We provide you with an overview of the last month in tech in each issue of *APC*, but for the latest news updates, check out *APC*'s online news. *APC*'s award-winning journalists are on the case every day, reporting news from the biggest events in tech around the world.

We report breaking tech news as it happens, and we always secure the Australian release dates and pricing as often as possible, so you don't have to go hunting for it yourself.

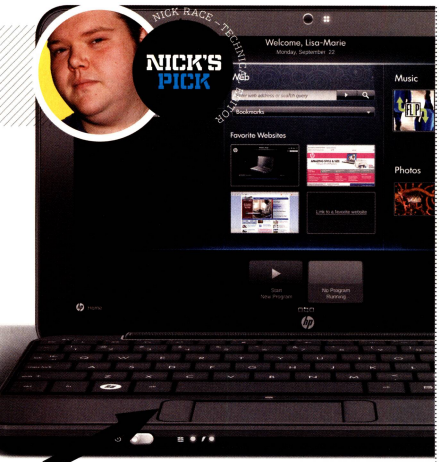
apcmag.com/news



Got computer problems?

apcmag.com has a vibrant online forum community, centred around helping you get the most from your PC and fix any problems you face along the way. If you've got a problem, go to **apcmag.com/forums** and post your question in the appropriate topic area.

apcmag.com/forums



HP MINI 1000

HP's Mini 1000 is the new top dog of the netbook market. It's got the best keyboard we've seen and a thinner, lighter and more compact design than the competition. HP's high standard of manufacturing comes through, with a solid design.

PERFORMANCE ★★★★

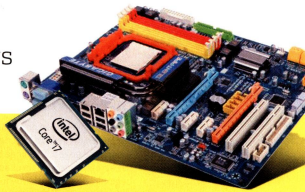
This model earns points for potential. With the usual 1GB of RAM for XP licensing reasons and an Atom processor at 1.6GHz it's pretty much par for the course. There's built in room for a 3G card, so keep an eye out.

PRICE ★★

The Mini 1000 isn't the cheapest 10in notebook on the market by far. The use of a 1.8in hard disk drive will mean a bigger price tag if you want to upgrade it in the future. Although it does buy you a very slick netbook.

SETUP ★★★★

The Mini 1000's design is top notch, the keyboard is great to type on and it looks outstanding. Our only gripe is the use of custom connectors for VGA, which means carrying around a dongle if you need to do presentations.



LABS ROUND-UP

CORE I7 COMPONENTS

APC staff and some of Australia's most prolific professional PC builders pick the best components for entry-level quad core PCs.

38

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Sony VAIO VGN-CS16GT

A media-focused notebook for the masses.

Sony
www.sony.com.au
$2,299

✔ Good battery result.

✖ Not too sturdy; a bit slow; average screen.

SPECIAL FEATURES
Intel Core 2 Duo P8400 CPU
2GB of DDR2 RAM
NVIDIA GeForce 9300M GS

By the time it landed on our doorstep, our review model was looking a bit rough around the edges. The hinge between the screen and the main chassis was beginning to fall apart. Due to a more sturdy inner hinge there was no threat of losing the screen altogether. Still, there's reason to be concerned.

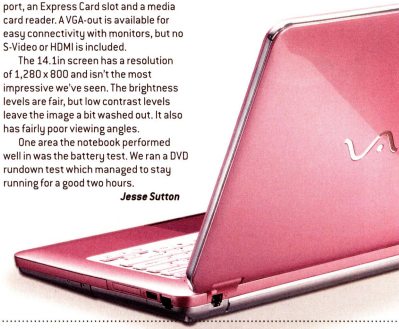
It's not a high-performance model, but it's not too shabby. In PCMark Vantage it scored 2,799, suggesting it will run all your regular applications. However, multi-tasking a number of these will begin to slow the system. An Intel Core 2 Duo P8400 CPU is at the heart, running at 2.26GHz on a 1,066MHz FSB and a 3MB L2 cache. There's 2GB of DDR2 RAM, which is upgradeable to 4GB. An NVIDIA GeForce 9300M GS (128MB) takes care of the graphics.

Networking consists of Wi-Fi 802.11 a/b/g/n and Bluetooth 2.0 — and it's DLNA certified. On the downside, it only supports a 10/100 Ethernet connection, rather than a Gigabit Ethernet port. It also offers three USB ports, a mini-FireWire port, an Express Card slot and a media card reader. A VGA-out is available for easy connectivity with monitors, but no S-Video or HDMI is included.

The 14.1in screen has a resolution of 1,280 x 800 and isn't the most impressive we've seen. The brightness levels are fair, but low contrast levels leave the image a bit washed out. It also has fairly poor viewing angles.

One area the notebook performed well in was the battery test. We ran a DVD rundown test which managed to stay running for a good two hours.

Jesse Sutton



MSI E620

A home theatre laptop for less than $1,500?

MSI
www.msicomputer.com.au
$1,399

✔ Large screen for the price; build quality feels rugged.

✖ The large screen is too low-res; weak GPU for the price; no HD drive or TV tuner — yet it's a multimedia/theatre notebook?

SPECIAL FEATURES
Radeon HD 3470 GPU
2.26GHz Core 2 Duo
2GB of DDR2 800 RAM 3

The E620 is actually affordable, at around $1,400. It's also smaller than the high-end theatre notebooks, at 2.7kg. Not exactly lightweight, but a featherweight when compared to the big boys. So what compromises has MSI made to keep the E620 cheap and relatively mobile yet still a so-called multimedia notebook?

If you plug a HDTV tuner (not included) into the E620 it will be a perfect fit, as most HD signals use the 16in screen's 16:9 ratio. The screen has a resolution of only 1,366 x 768, and viewing angles are surprisingly healthy. We weren't impressed by contrast or brightness though.

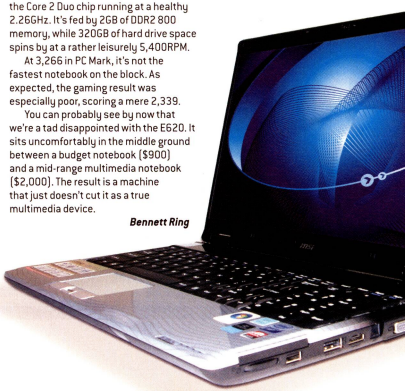
Powering the screen is a Radeon HD 3470 GPU. While it might be a DirectX 10-compatible chipset, the E620 trembles at the thought of playing any DirectX 10 games. Thankfully the 3470 chip has hardware decoding for MPEG-2, H.264 and VC-1 video formats, helping to offload the work from the CPU.

Not that the CPU is a slouch, with the Core 2 Duo chip running at a healthy 2.26GHz. It's fed by 2GB of DDR2 800 memory, while 320GB of hard drive space spins by at a rather leisurely 5,400RPM.

At 3,266 in PC Mark, it's not the fastest notebook on the block. As expected, the gaming result was especially poor, scoring a mere 2,339.

You can probably see by now that we're a tad disappointed with the E620. It sits uncomfortably in the middle ground between a budget notebook ($900) and a mid-range multimedia notebook ($2,000). The result is a machine that just doesn't cut it as a true multimedia device.

Bennett Ring



7/10

Dell Studio XPS M1340

Design overhaul with more power, but not a gaming monster.

Dell
www.dell.com.au
$2,680

Excellent design; great form factor; powerful.

Graphics are a wash; 5,400rpm hard disk drive.

SPECIAL FEATURES
2.53GHz P9500 Intel Core 2 Duo
4GB of DDR3 RAM
NVIDIA GeForce 9500M GE

The M1340 offers a 2.53GHz P9500 Intel Core 2 Duo (Montevina, 45nm, 1,066MHz FSB, 6MB L2 Cache) CPU, with 4GB of DDR3 RAM (1,067MHz), a 500GB, 5,400RPM hard drive and an NVIDIA GeForce 9500M GE (256MB GDDR3) graphics card. It shipped with Windows Vista Home Premium 64-bit.

This profile allows plenty of power to run Office apps and internet browsers to more taxing programs like Adobe Illustrator or Photoshop. We had no issues running any of these and the system achieved a score of 3,676 in PCMark Vantage.

Physically it's beautiful. At 2.2kg it's not as clunky as a 14 or 15in model, but not as tiny as a 12in notebook either. Its smooth lines, slim design and edgeless display all look great and the aluminium-highlighted magnesium-alloy chassis feels solid.

Above the keyboard are a series of backlit, touch-sensitive media controls, a wireless on/off button for Wi-Fi and Bluetooth, and an eject button for the 8x DVD ± RW slot-drive. A Blu-ray option would have been nice. The screen is sharp, though the resolution maxes-out at 1,280 x 800.

What's most deceiving about this machine is the NVIDIA GeForce 9500M GE with its 'Hybrid SLI' technology. This sounds far more impressive than it really is. What the 9500M GE really is, is a dedicated 9200M GS plus an integrated 9400M, and ultimately offers a mere 24 shaders, with a 64-bit memory bus. Some games that offer multi-GPU benefits may garner a performance boost, but overall it's only good for DirectX 9 games.

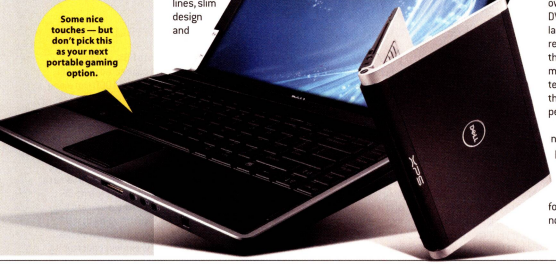
We weren't able to run 3DMark Vantage as it requires a minimum resolution of 1,280 x 1,024, and our 3DMark 2006 score of 3,586 isn't particularly impressive.

There are plenty of connectivity options, including everything from HDMI and Display port to eSATA and FireWire. There are only two USB ports, which is a little limiting. There is a VGA-out port, but those with older TV's may have issues with the lack of S-Video.

On the networking front there's a Gigabit Ethernet port and Wi-Fi 802.11 a/b/g/n. As NVIDIA's MCP79MX chipset has been used, Dell has installed its own 1515 Wireless N mini-card. In our DVD battery rundown test the notebook lasted two hours and 10 minutes: a good result, especially considering we ran the test in the same 'BoostPerformance' mode as we ran our performance test. We expect you'd get more out of the 6-cell battery if you cut back the performance to 'Save Power' mode.

There's no question this is a great notebook, especially if you need power and portability, but don't look at this as a gaming option. While it will play some games in lower settings, it's a bitter disappointment for desktop gamers looking for a notebook alternative.

Jesse Sutton



FreeNet Antennas
20km* Access Point
Imagine the performance in your house!
• 5 operating modes
• 60/90/130/200 mW versions available
Just $89
Dealer inquiries welcome
* With external antenna
www.freenet-antennas.com/apc



HP Mini 1000

HP's second-gen netbook takes a stab at the mainstream.

HP
www.hp.com.au
$899

✔ Superlative keyboard; great overall design; solid build quality.

✖ Relatively small hard drive; only two USB ports.

SPECIAL FEATURES
Atom 1.6GHz N270
1GB RAM
Windows XP Home

While the 2133's spec set was about as out-there as you could get for a netbook, the Mini 1000 largely sticks to the now-established netbook recipe. That means an Atom 1.6GHz N270 processor, 1GB of RAM and Windows XP Home Edition.

One variation is the hard drive. Even for a netbook with a 10.2in screen the Mini 1000 is quite compact, which has necessitated the use of several smaller-than-the-norm components such as a 1.8in hard disk instead of the conventional 2.5in drive, although we doubt the difference would be noticeable in day-to-day use. What you will notice is the meagre 80GB capacity of that drive.

One place where the Mini 1000 takes the lead is its design. It's thinner, lighter and more compact than most other 10.2in netbooks. But its standout design trait is its keyboard. Sized to 92% of a regular keyboard, it's the best we've ever used. The primary keys are large, the layout is spacious and key positioning is spot on.

The lush 10.2in widescreen 1,024 x 600 display is incredibly bright, thanks to the use of LED backlighting. This is enhanced by a pane of high-gloss glass which extends all the way to the edges of the lid. Take it outdoors and there's no prize for guessing the downside of this dazzling display: it turns into a highly reflective panel that's better for brushing your hair than browsing the web.

The compact form of the Mini 1000 also necessitates a few compromises on the selection of ports. There are only two USB ports, a memory card slot for SD and Memory Stick wafers, along with an insert that conceals the bay for HP's Mini Mobile Drive system. There's a combined headphone/mic audio socket and a 10/100 Ethernet jack. It also has a proprietary connector which substitutes for the standard VGA port in order to retain the Mini 1000's slim profile.

The port will be used to connect a yet-to-be-announced docking station and perhaps an undoubtedly overpriced CD/DVD drive. It's also the only way to hook up your Mini 1000 to an external screen or projector.

Battery life is roughly equivalent to what we've come to expect from most three-cell 10.2in netbooks, if a little on the shy side. Playing back a handful of downloaded videos with screen brightness set to 66%, volume at maximum and connected to a Wi-Fi network saw the Mini 1000 trot along for two hours, 15 minutes.

Both the memory and hard drive can be upgraded, although the degree of difficulty varies. HP has not only allowed room for a 3G HSDPA radio, but has already fitted a SIM card slot into the battery compartment in readiness for such an upgrade. There's no 3G module present in the mini-card bay, of course, but we're hoping that HP introduces this as an option on the Mini 1000 at the earliest opportunity.

Given HP's propensity to overload its PCs with a barrel load of bloatware, we were delighted to see the Mini 1000 escape the factory almost unsullied. The sole pieces of pre-loaded software are AOL's Instant Messenger, which is useless for Australia but easily deleted, and Microsoft's Works 9 suite.

The Mini 1000 has plenty to offer the average PC buyer. But more tech-savvy shoppers will be waiting for that sticker to be slashed by at least $150 before the Mini 1000 can really stand its ground against some of the better-spec'd competitors.

David Flynn

8/10

ASUS Eee Top

Panel PCs are a mixed bag, but ASUS might have got it right.



ASUS
http://eeepc.asus.com/au
$1,299

Looks good; works well; reasonably priced.

Can slow down.

SPECIAL FEATURES
15.6in glossy touchscreen
ASUS 'Easy Mode'
1.6GHz Atom processor

The ASUS Eee Top is sold as a PC for novices, but those using it as a web/network terminal in another room will get the most out of it. It has netbook-level specs but is based around a 15.6in glossy touchscreen with a 16:9 aspect ratio and 1,366 x 768 resolution. It runs Windows XP but, on top of this, is ASUS's 'Easy Mode' application, which apes HP's TouchSmart. Easy Mode displays large, finger-friendly program-launch icons that are divided into four tabbed groups (similar to the original Eee PC). It's incredibly smooth and responsive, arguably more so than the much higher-powered TouchSmart. However, if you've got a few programs open it seriously starts to lag; probably due to the lowly 1GB of RAM and weak Intel graphics.

Input can be made via the wired keyboard and mouse. The keyboard is a bit small, but comfortable. It also looks good with its Mac-style protruding letters.

Physically the system looks very cute with its clean white chassis and peripherals plus the blue-lit perspex base. A carry handle makes it easy to move. There's a button so that you can turn the screen off and volume and brightness controls too. Connectivity includes a USB port on the keyboard, two on the side and four at the back. There's also a memory card reader which supports Memory Stick and SD cards, a wired LAN port, three audio jacks and wireless internet. The 4W speakers sound pretty good considering their size, though don't expect much bass. There's no optical drive. Everything ticks along nicely thanks to the 1.6GHz Atom processor but there's only a nominal 160GB storage. It's also tricky to upgrade.

At $1,299 it's good value, and we'd gladly have it in any room of our house as a great second PC.

Nick Ross

NA 10

IBM BladeCenter S

Plug in and go, then build it up as you need.

IBM
www.ibm.com.au
From $4,219

Expandability; configurability; low barrier for entry.

Despite the marketing, it's not quiet enough for office operation.

SPECIAL FEATURES
6-bay storage module
2 x 950/1450W power supplies

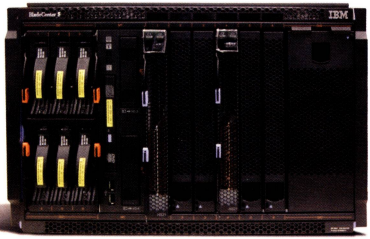
These are tough economic times, especially in the small business space. Saving what you can on your IT capital expenditure is paramount, and buying the right gear is the best advice anyone can give. But what is the best hardware and how do you cater for better times while reducing your costs now?

Blade servers have been coming into their own over the past five years. Originally seen as the playthings of large server farms or hugely high-density computing environments, Blades have been rejigged to be useful and used by small and medium business as truly upgradeable servers. The BladeCentre S is a great example. The chassis at $4,219 is the foundation of the system and includes a 6-bay storage module supporting six 2.5in drives (SAS or SATA as required), space for six blades and four IO modules. The price also gets you 2 x 950/1450W hot-pluggable power supplies, an advanced management module (which includes out of band and remote management tools).

Our review model was outfitted with two Blades. First was an HS12 model (from $1,639), roughly equivalent to a standard uni-processor server including an Intel Xeon chip, 2GB of RAM and room for two internal SAS drives. The second Blade was the HS21XM model, a dual Intel Xeon, low power blade with a memory capacity of up to 32GB and two internal hard disk drives from $3,299.

The HS21XM hosted a VMWare VI3 hypervisor running a combination of SLES10, Ubuntu desktop and W2K3 server, while the H12 ran the whole schmozzle with Windows 2008 Enterprise server. Furthermore, the system runs a 'Start Now' configuration wizard, allowing administrators without any specific Blade experience to jump right in. It seems Blade servers aren't just for the big boys any more.

Nick Race





This smartphone-lite covers all the basics when it comes to communication standards.



Schminq: extremely compact and light, with a classy brushed aluminium casing.

6/10

3 INQ

More communications options than your typical phone.

3
www.three.com.au
$179

Affordable; excellent live address book; easy-to-use.

Crashes frequently; lots of limitations in the software; laggy.

SPECIAL FEATURES
Windows Live Messenger
Skype
Facebook

The INQ, pitched as 'the world's most advanced social networking phone', tries to merge all the different mobile communication methods together into one easy-to-use prepaid mobile, but whether it does a better job of it than the classic smartphones depends on just how much functionality you're willing to compromise on.

If you're after the basics, the INQ has got you covered. Its offers Windows Live Messenger for chatting, Skype for VoIP, Facebook for social networking, an email client, and the standard phone functions for voice calls and text messaging. Our favourite feature is the live address book, which pulls contacts from each of your services and plugs them into the contacts list. Once your contacts are all organised, you can then open the address book and get a choice of how you wish to contact each person: phone, Windows Live Messenger, Facebook, Skype or email.

The INQ's got its heart in the right place, but in practice, we found the phone to be too buggy and limited. The INQ is the most unstable mobile we've tested in a long time. Windows Live Messenger was particularly flaky — seven times out of ten, launching the program would cause the phone to crash, and we constantly got 'Soap Exception' errors.

Facebook and Windows Live Messenger are the INQ's two main drawcards, but if you're hoping for PC-like functionality, you're in for a big disappointment. The only features that the Facebook program offers above the generic mobile version of the site is that new friend requests and messages come up as system prompts, much like a text message or missed phone call. Really, you're better off just logging into Facebook through the web browser.

As for Windows Live Messenger, it's got most of the features that you'd expect in a mobile client, but for some reason you only get notified of new messages if the Windows Live Messenger program is active.

The Skype service is probably the most well-developed application. Unlike Skype on the desktop and Windows Mobile, however, you can't call landlines or mobiles — calls are strictly limited to within the Skype network.

Those are our main gripes when it comes to the INQ phone; in other respects, it's pretty decent for an entry-level mobile. It's extremely compact and light, with a classy brushed aluminium casing and sturdy spring-loaded slider.

Multimedia is a mixed bag on the INQ. The external speaker is one of the loudest we've heard on a mobile, and it'll happily stream YouTube clips and play back stored music and movies through its media player. On the other hand, it only uses the one connector for the syncing, charging, and connecting headphones, and internal memory is a measly 50MB (although there's a microSD slot for adding more storage).

Most browsers at this end of the market are limited to WAP only, so we were pleasantly surprised to discover the INQ has a full HTML browser. It does a good job at rendering complicated web sites, but it's extremely slow — the pages load slowly despite the phone's fast HSDPA connection, and scrolling through pages also happens at a snail's pace.

The latter can probably be put down to the INQ's limited processing power. Couple that with the buggy state of the INQ's firmware, and you've got a phone that's more than a little frustrating. We're a big fan of the whole 'smartphone for the rest of us' concept, and love the INQ's live address book feature, but the numerous bugs and limitations make it a hard phone to recommend — bargain basement pricetag notwithstanding.

Jenneth Orantia



Ample thumb space is provided on the Dream's expansive keypad.

HTC Dream

A smartphone for the rest of us.

HTC
www.htc.com/au
Available on post-paid plan with Optus

Spacious keyboard; hi-res screen; intuitive user interface; snappy performance.

Poor camera; short battery life; bulky and heavy.

SPECIAL FEATURES
Android OS
3.2in touchscreen
QWERTY keyboard

APC MAGAZINE EDITOR'S RECOMMENDATION

The HTC Dream is the first smartphone to run the open source Android OS. It's also the first handset we've seen from HTC that runs something other than Windows Mobile.

To look at, it bears a close resemblance to one of HTC's older smartphones, with a 3.2in 320 x 480-pixel resolution touchscreen dominating the front and a QWERTY keyboard that slides out from behind the display. It's positively brick-like, weighing a portly 158g.

It's easily one of the best smartphone keyboards we've typed on; the keys are slightly raised with a satisfying click when you press them, and there's ample room to manoeuvre both thumbs around.

Unlike other smartphones that offer desktop synchronisation with Outlook and other vendor-specific software, there are no such apps for Android. It either syncs with Google or not at all, which will prove problematic for corporate users.

The only drawback to accessing Gmail on the Dream is that there's no native support for Office and PDF attachments. Gmail renders them as inline HTML files, but you can't save them as there are no viewers or editors on the phone. In that sense, we wish Google had widened the scope of services available on Android to include Google Docs and Spreadsheets.

All the typical features are present on the browser: it parses full HTML and JavaScript (but no Flash), supports multiple open windows and has a password manager for remembering login details. It doesn't offer multi-touch like the iPhone, but panning and scrolling around the page is smooth using your fingertips.

One limitation is that apps can only reside in the phone's main memory, which is only around 50MB. We installed 15 programs and were down to a measly 33MB to play with.

The Android UI is refreshingly simple. You can have up to three home screens populated with your choice of shortcuts, widgets, bookmarks and photo speed dials, and there's also the main icon-driven menu screen (which isn't customisable) where all the programs, functions and settings live.

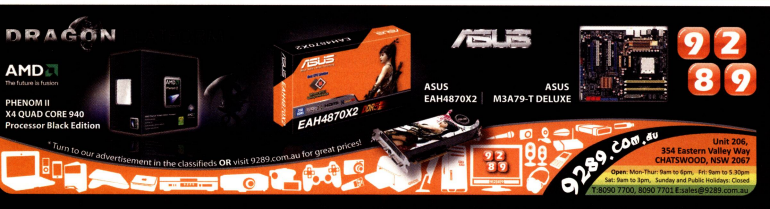
Unlike the iPhone, Android can run programs in the background, so it'll happily download email, keep chat sessions open and play music and net radio while you're doing other things.

Given the HTC Dream's strong consumer focus, we're surprised it hasn't got more going for it in the multimedia area. There are simple Pictures and Music programs in the base set of software, and that's about it. The 3.2-megapixel camera, too, is extremely basic.

The HTC Dream is almost as full-featured as other smartphones when it comes to wireless functionality. Almost. The quad-band GSM/GPRS/EDGE radio means you'll be able to at least get GSM reception, but the single-band 2,100MHz HSDPA radio limits its 3G coverage. It's also got GPS, 802.11b/g Wi-Fi, and Bluetooth 2.0, although the latter is limited to mono headsets only — those looking for stereo Bluetooth functionality or wireless file transfers are out of luck.

The HTC Dream is a good option for those looking for an easy-to-use smartphone to access the net and email on. The Android UI follows the Google ethos of being intuitive and user-friendly, and the Market app makes it a no-brainer to install lots of extra software and games.

Jenneth Orantia



8/10

GeForce GTX 285 1GB

A single GPU card with no SLI issues.

Gigabyte
www.gigabyte.com @
$799 $

Excellent performance; decent launch price. ✔

Light package. ✖

SPECIAL FEATURES i
648MHz
1,476MHz shader clock
1GB of GDDR3

APC MAGAZINE DUAL-CORE RECOMMENDED

Upon looking at the specifications of the card, we can clearly see it has the potential to be exceptionally fast. The core comes in at 648MHz, which is 46MHz above the current top-of-the-line single GPU card from NVIDIA, the GTX 280. The shader clock has managed to get quite a large increase of 180MHz, bringing it to 1,476MHz; while the memory uses the same 512-bit memory interface and carries with it 1GB of GDDR3, which has been increased from 2,214MHz DDR to 2,484MHz DDR.

The main goal for the GTX 285 is to offer performance that makes people want to upgrade from a GTX 280 to a GTX 285. If the single GPU card also manages to beat out the dual GPU-based HD 4870 X2 from ATI, then it's a real bonus. Under 3DMark Vantage we find that the GTX 285 manages to offer a slight performance boost over the GTX 280, but still falls to the older HD 4870 X2.

When moving into real-world games such as Crysis Warhead, Far Cry 2 and World in Conflict, we found the GTX 285 beat out the HD 4870 X2. We even saw that when at 2,560 x 1,600, currently the most intensive resolution available to gamers, the difference between the HD 4870 X2 and GTX 285 is non-playable to playable, with the GTX 285 breaking that important minimum 30FPS barrier.

The GTX 285 is ultimately a 55nm GTX 280 that's overclocked. This isn't necessarily a bad thing and it really has some good performance on offer. While the upgrade from a GTX 280 to the new GTX 285 might be a bit hard to swallow, if you're looking for a graphics card and don't want to stretch to the higher price of the GTX 295, the GIGABYTE GTX 285 manages to pack a serious punch.

Shane Baxter



The GIGABYTE GTX 285: manages to pack a serious punch.

8/10

GeForce GTX 295 1792MB

Looks set to reclaim the performance crown.

Gigabyte
www.gigabyte.com @
$899 $

Performance; good power draw; quad SLI is actually feasible. ✔

Expensive; package lacking extras. ✖

SPECIAL FEATURES i
Two cores at 576MHz
1,242MHz shader clock
1,792MB of GDDR3

APC MAGAZINE DUAL-CORE RECOMMENDED

These days, to be on top there's no denying that two cores on the single PCB are needed. Sometimes that isn't even enough and some serious MHz has to be pushed through them. The GTX 295 is essentially two GTX 260 cards on a single PCB, but unlike the older GTX 260s this card uses 55nm chips, which helps keep both power and heat down.

The two cores come in at 576MHz each, while the shader runs at a reasonable 1,242MHz. Looking at the whopping 1,792MB of GDDR3 memory, this carries a 2,000MHz DDR clock. The GTX 295 utilises a 448-bit memory interface, which is the reason for the odd memory amount; we also see 240 processing cores and 80 texture units. NVIDIA has rated the board at 289 watts, which is reasonable for a card of this magnitude.

When it came to testing the power our system was putting out, idle came in at 221 watts while we saw 423 watts at load. The idle is significantly lower than the HD 4870 X2, while the load is only slightly lower. Again, though, this is very impressive for a card that is designed to beat the HD 4870 X2.

Performance is ultimately what this card is about and it flies in absolutely everything you throw at it. Intensive games like Far Cry 2 and Crysis Warhead are now playable at that ultra-high 2,560 x 1,600 resolution. The card really offers performance that we didn't think we would see for some time yet.

The GTX 295 is an impressive card, and if you're looking for the ultimate graphics card on the market, you simply can't go past this. The good news is if you have the money and want to get into a second one, Quad SLI manages to yield some excellent performance improvements that make 2,560 x 1,600 gaming with AA and AF possible as well.

Shane Baxtor



If you're looking for the ultimate graphics card on the market, you simply can't go past this.

6/10

Nirv HAF-920-295

Monstrous in every way.

Nirv
www.nirv.com.au
$4,943

✔ Great gaming performance; lots of room for upgrades.

✖ A bit noisy; rather expensive; slow 2D performance.

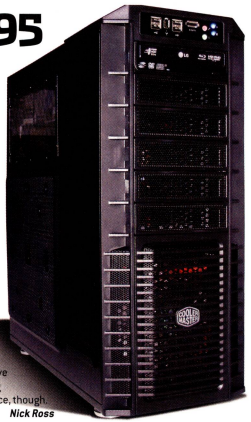
SPECIAL FEATURES
2.67GHz Core i7 920 CPU @ 3.82GHz
Palit NVIDIA GTX 295 dual-GPU
6GB of high-performance DDR3 RAM

Buying a monster, overclocked gaming PC is like buying a super car. It's highly-strung, on the edge, and will almost-certainly need servicing more than a Toyota Camry during its lifespan. The HAF is based around a 2.67GHz Core i7 920 CPU which, the documentation says, has undergone 'NirvTuning Level 3'. It now runs at 3.82GHz. However, it scored a lowly 5,748 in PC Mark Vantage which makes it the slowest Core i7 machine we've seen. It was a different story in our 3D test. Thanks to the speedy new Palit NVIDIA GTX 295 dual-GPU graphics card with 1,792MB of GDDR3 memory (plus two DVDI ports and a single HDMI), it blasted to 21,794 in 3D Mark Vantage. That's the highest score we've seen.

Other components include 6GB of high-performance, triple-channel DDR3 RAM from OCZ. A 1,000W SilverStone Power Supply keeps everything ticking over smoothly and a large Thermalright Ultra-120 Extreme heatsink (with 120mm fan) cools the processor. The motherboard is ASUS's X58-based P6T. It's not got the features of the deluxe version but only hardcore overclockers should notice. There are two spare PCI-E x16 and PCI slots and, at the back, there are six USB ports, eSATA, optical and coaxial S/PDIF out, Gigabit Ethernet and six audio jacks. There are two hard disks: a 128GB OCZ solid-state boot drive and a 1TB Samsung drive for storage.

But everything is let down by its core performance. We'd forgive a great deal if it didn't cost the earth but, at almost $5,000, for a PC without any peripherals, it's very expensive indeed and should be working properly. Huge 3D performance, though.

Nick Ross



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9/10

Antec 850-Watt TruePower Quattro

Power for the hardcore gamer in your life.

Antec
www.antec.com
$330

Connectivity; power; excellent quality; also available in 1Kw.

Expensive; 850-Watt the lowest model.

SPECIAL FEATURES
Four +12v rails
Several connectivity options
Low-noise 80mm fan

APC MAGAZINE apc EDITOR'S CHOICE

Antec has well and truly managed to seal its name into the power supply business thanks to a great line-up of units over the years. As we've had newer graphics cards come out along with the ability to add more GPUs, this transition means that we've also seen a need to use bigger power supplies.

Depending on what kind of PC you want to run, you can choose one of Antec's less powerful TruePower or NeoPower units. But if you're looking at something a bit more serious, you can check out the TruePower Quattro or Signature Series. The TruePower Quattro series sits behind the Signature series but actually offers a 1000-Watt model, which is excessive for most. The 850-watt unit may be a better option for many of you.

With four +12v rails outputting 18A each, the 850-watt TruePower Quattro definitely looks the goods. Connectivity isn't short either; there's your standard connectors like 20+4 pin, 4-pin 12V, 8-pin 12v, AUX and two floppy connectors present. With eight SATA and nine molex connectors also on offer, any hard drive expansions should also be well and truly covered. If you're looking at doing a serious graphics card setup, you won't be missing out with two 6-pin and two 6+2-pin PCI-E connectors present, so support for dual graphics cards isn't an issue.

As far as 850-watt being enough, when placing the unit onto our testbed, which was holding two GTX 295 cards, it didn't miss a single beat! This is great news for people who are looking at building an i7 powerhouse.

While a little bit on the pricey side, good things never really come cheap and this isn't an exception. With good connectivity, low-noise 80mm fan, 80plus certification, semi modular connectivity and some fancy race lines down the middle, the Antec 850 Watt TruePower Quattro will do for the most hardcore gamer.

Shane Baxtor



7/10

FortuneTec KA-8K01

Small, quiet, BYO Atom chassis.

Fortunetec
www.fortunetec.com.au
$129

Small, neat system; ample power.

More USB ports and a card reader would be nice.

SPECIAL FEATURES
70 x 265 x 290mm
Room for optical drive
Room for 3.5in HDD

Mini ITX is the bastard child of the desktop family, but it's now seeing new kinds of success. With the majority of Mini ITX systems traditionally using VIA's series of Mini ITX EPIA solutions, performance was never on top of the list of plusses.

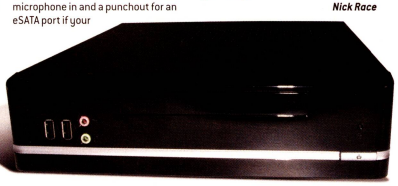
Sure, if you needed a very small, low-powered system for a secondary usage, say as a firewall or basic desktop, then you could easily grab an EPIA system and any old chassis for a slap-together solution that would work quite nicely. These days, there's another player in the Mini ITX market making big inroads: Intel. The success of the Atom processor in the netbook and budget notebook market has had an interesting spin-off effect, with vendors making Mini ITX solutions for small desktops using Atom.

The KA-8K01 is a small desktop-styled case measuring 70 x 265 x 290mm (HWD) and with a single cooling fan. There's room for a slim optical drive, which solutions like the Eee Box don't have, and a single 3.5in hard disk drive. The 3.5in drive is the true bonus here, allowing faster and high-capacity drives to be installed. The KA-8K01 is packed with a 160W power supply, offering ample power for a Mini ITX system.

The case's connectivity options are limited to two front-mounted USB ports, headphone audio out and microphone in and a punchout for an eSATA port if your motherboard supports it. Aesthetically it's fine, with a piano black finish and silver highlight.

So why would you go for it? With an Intel Atom 330 dual core board and chip for around $160, a gig of RAM at $50 and a terabyte of storage hovering around $200, you're looking at a solution about as powerful as a last-generation system, with considerably more storage (and only half the size of your VCR).

Nick Race



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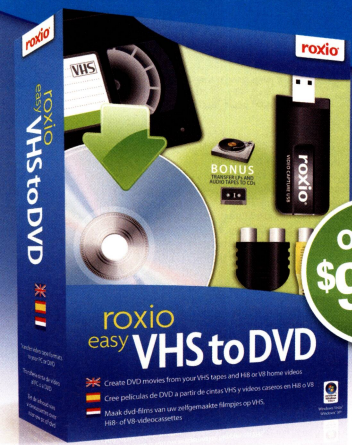


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9/10

Sony BRAVIA 46XBR45 LCD

Is LCD finally catching plasma?



Sony
www.sony.com.au
$6,399

Outstanding image quality; good remote; connectivity. ✔

Sound is pretty average; lost its design impact. ✖

SPECIAL FEATURES
LED backlighting
100Hz motion engine
Integrated HD tuner

APC MAGAZINE apc EDITOR'S CHOICE

LCD and plasma TVs have been sitting on the opposite sides of a scale. On one side, we have LCDs, which have fulfilled the need for bright colours in bright environments, and on the other we've had plasmas offering deep blacks and a cinema feel when you can turn the lights down.

The issue has been LCD's backlighting, an array of lights behind the LCD panel that provides the luminosity and allows you to see what's going on. LCD panels had to work hard to block these bright lights for an on-screen black, with varying success.

Sony's new range of BRAVIA screens (the XBR45 line but only in the 46in and 55in sizes) have gone to extremes to offer new levels of contrast and deeper blacks not seen in LCDs to date. They've cleverly used LED backlighting in three different colours (red, green and blue) which can be turned off or toned down when black is required, and shone in any number of colours to help the LCD panel pop with colours. It does a great job.

Set up with a Blu-ray player running the ubiquitous Pixar "best case scenario" film, the colours almost burst out of the screen, while black and darker areas retain some of the detail usually lost on an LCD. There's almost no issue with jaggies, ghosting or other LCD bugbears thanks to a 10-bit panel and a 100Hz motion engine. The integrated HD tuner works fine, if a little touchy with reception for our liking.

Connectivity includes four HDMI connections, Ethernet, two component, three composite and a USB port (for images off memory stick). The unit's RF remote is quite large, though this allows larger buttons and is surprisingly comfortable in the hand.

Is it a perfect LCD though? Sadly not. The design over all seems quite staid, considering Sony's history with the BRAVIA X series TVs being quite visually stunning. We weren't hugely impressed with the new embedded speaker design, with the sound being quite average. So you'll definitely want to pair the screen with a proper surround sound system.

Nick Race

8/10

Kworld DVB-T 395UR

Great-value basic HD tuner stick.

Kworld
http://au.kworld-global.com
$79

Works with Eee PC and netbooks; easy-to-use; good value. ✔

Single HD tuner only; no analogue reception or inputs. ✖

SPECIAL FEATURES
USB tuner stick
Remote control
TV antenna

APC MAGAZINE apc RECOMMENDED

The Kworld DVB-T 395UR is a fairly basic HD tuner card that allows you to watch HD digital TV on your PC or notebook. There is nothing flash such as dual tuners, analogue inputs or a built-in radio, but as a tuner, it works well.

Inside the box is the USB tuner stick with retractable cover (so you don't keep on losing the cap), remote control, TV antenna (which is useless unless you live in an outstanding reception area) and software bundle. The USB stick is larger than most since it allows you to plug an antenna cable directly into it without needing an adaptor or special cable.

The remote control is credit card sized with membrane buttons that are functional but have a squishy feel to them. The remote does give you control over most software functionality including channel, volume, recording and time slip playback. The first 1,000 units shipped come with CyberLink PowerDirector 7 and PowerProducer 5, which allows you to edit captured video and optionally burn it to DVD. After these bonus units are sold, the software bundle will only include Kworld Hypermedia software, which is a functional PVR package with fairly standard features such as timer recording and time slip. If your machine supports it, the software allows you to put the computer to sleep or wake up from hibernation when a recording occurs. The software may be basic but it does the job.

The killer reason why you would buy this card over the others is that Kworld have produced a lite version of Hypermedia, which works on the Eee PC and other netbooks (such as the Acer Aspire One which we tested it on). Now don't expect to get the full HD experience on a tiny 1,024 x 600 screen, but being able to use your netbook to watch and record TV is really cool. For this feature alone we highly recommend this card.

David Neiger



7/10

Sony BDP-S350 Blu-ray

A lot of Blu-ray for your money, but missing some features.

Sony
www.sony.com.au
$479

Supports BD-Live; DVD not region locked; good value.

Does not support DTS-HD Master Audio; no support for MP3.

SPECIAL FEATURES
Multi-region support
AVCHD support

It must be difficult for a company to distinguish between different models of Blu-ray players at different price points, but to be fair to Sony, they have done a good job with the BDP-S350, which may be priced as a budget player but still provides many features.

The unit is about the size of a typical DVD player, with a stylish bevelled front and LED display. There are a few basic controls on the front of the unit for playback with recessed switches for power and opening the disc tray. The back of the unit has the usual outputs as well as an Ethernet port to access Blu-ray Live content and a port for a USB memory stick which you will need in order to use Blu-ray Live, since the player does not have its own internal memory for that purpose. The remote control is typical Sony style, which is large enough to fit in the hand but a little chunky.

Picture quality is good, although our tests (using the Silicon Optix test discs) did show a little picture noise on Blu-ray playback which is noticeable if you are looking for it. DVD upscaling was very good and, unlike many other Blu-ray players, the BDP-350 plays all region-coded DVD discs. If you have an HD camera, the player supports AVCHD DVD discs for high-resolution playback.

Audio support is mediocre, with only Dolby TrueHD 7.1 surround sound supported rather than both TrueHD and DTS-HD Master Audio. Discs recorded in DTS-HD Master Audio will only play back the 5.1 channel DTS audio track. CD audio support is also limited to CD audio discs, with no support for MP3 or WMA discs. Another limitation is photo playback is restricted to JPEG only.

If you are looking for a budget Blu-ray player that is not cheap and nasty, then the BDP-S350 may be ideal, particularly if you don't need 7.1 audio.

David Neiger



7/10

Kaiser Baas Video to DVD

An easy-to-use analogue video converter for the non techie.

Kaiser Baas
www.kaiserbaas.com/
$79.95

Very easy to use; software included; easy capture of video stills.

Very limited functionality; older versions of software provided.

SPECIAL FEATURES
Cyberlink PowerDirector 6
Cyberlink PowerProducer 4

If you are looking for a really easy analogue video to DVD converter for a non techie in your life, then the Kaiser Baas Video to DVD Maker may be just what you want. By bundling a small USB analogue to MPEG video converter with easy-to-use Cyberlink software, Kaiser Baas have made converting your old VHS and Video-8 movies to DVD a real plug and play exercise.

Simply connect the USB stick to a free USB port, load the driver disc and install the driver. The computer will then automatically detect the USB stick. Since the drivers use BDA architecture the card should work with just about any BDA-compatible video capture package, although you won't need any since Cyberlink PowerDirector V6 and PowerProducer 4 are included.

These aren't the latest and greatest versions of Cyberlink software but they are adequate for the task of capturing video, doing simple edits, adding titles and transitions and burning the finished product to DVD.

The card supports both composite and S-Video inputs and by completely removing all complicated settings (such as video bitrate or capture formats), the package allows anyone to make quite watchable DVDs. As an added bonus, you can capture a still from the video whilst it is playing by simply pressing the button on top of the USB stick.

The Video to DVD Maker is not expensive; however, when you consider that most hybrid TV tuner cards allow you to do all of the same plus record digital and analogue television you have to wonder whether you shouldn't just spend a few extra dollars for much more functionality.

Great for novices, but if you are at all technical or want to capture the best quality video possible, this device is not for you.

David Neiger



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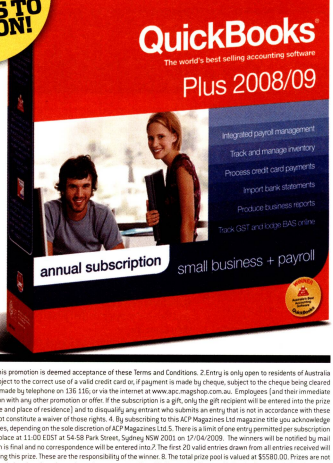
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Panasonic LUMIX DMC-G1

The DSLR that's not really a DSLR.

Panasonic
www.panasonic.com.au @
$1,649 with lens $

Easy to learn and use; full-featured; interchangeable lens. ✔

Dedicated battery cannot be charged in camera. ✖

SPECIAL FEATURES *i*
14-45mm lens
12 megapixels
3in LCD

The G1, while not strictly speaking a DSLR, nonetheless is a very good stepping stone to this style of photography due to the interchangeable lens facility. In the hand, the G1 is nicely balanced with the 14-45mm lens. Controls are straightforward with the now ubiquitous rotary dial allowing selection of functions, including a single custom setting you can create. On the periphery of the dial are switches to select single, multi, bracketing or timer modes and rounding out the top right of the camera, buttons for Film mode and the Quick menu.

Film mode lets you select colour, contrast and saturation options in an image such as smooth (lower contrast), nostalgic (lower saturation and contrast) and nature (brighter red, green and blue). In all, there are ten settings available, including three specifically for black and white. Quick menu allows you to quickly flip through all of the on-screen options.

The rear of the G1 is dominated by an enormous LCD for this size camera — three whole inches in fact with nearly 1.5 million pixels. This does a very good job of showing what the 12-megapixel "sees" and is viewable in even bright sunlight (it was tested on a savagely bright 40 degree day). The LCD also flips out and rotates 180 degrees. When flipped out, however, the camera becomes very unwieldy in the hand and this is really reserved only for tripod use. Aspect ratios available include 4:3, 3:2 and 16:9.

Controls via press buttons on the rear are function, ISO, white balance and an AF mode selector. All menu options that require on-screen icons are clear and easy to understand, and while there is a very good (paper) manual, a reasonably au fait person would be up and shooting with the G1 in only minutes.

To get images from the SD card-based G1, there are a couple of options in digital out and HDMI. There are also ports for DC in and a remote unit, plus USB 2.0 and composite.

I really liked the G1. While not requiring the big dollars of a dedicated DSLR, it has the flexibility of one in many areas and would certainly be more than sufficient for the person wanting to go a step above a point-and-shoot jobbie.

David Hague



Kogan DVC camcorder

The most affordable HD camcorder.

Kogan Technologies
www.kogan.com.au @
$369 $

Extremely affordable; lightweight; full HD. ✔

Poor image quality in low lighting. ✖

SPECIAL FEATURES *i*
HD 1080p video
5X optical zoom
3in LCD

Kogan's HD camcorder, aptly named DVC-Digital Video Camera, brings you high-quality HD video at an affordable price. While it has some compromises, at this price they're not showstoppers.

This camcorder looks and feels sturdy but is lightweight, partly because it only uses an SD memory card for storage and has a light battery. It sports full HD 1080p recording, 5X optical zoom, a large 3in LCD in 16:9 ratio, electronic image stabiliser, 5-megapixel still image capture and face recognition.

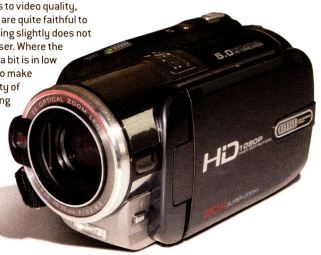
The simplicity that makes this camera very affordable also makes it easy to use. The menu system on the LCD is a pleasure to work with: very simple and easy to navigate without complicated multiple menu levels with hordes of features that the general user never touches.

There is also a very bright LED light, like a torch, attached to the front of the body, which can be turned on in low light situations. This proved to be handy when shooting at night and to attract the subject's attention.

When it comes to video quality, the DVC's colours are quite faithful to real life, and shaking slightly does not bother the stabiliser. Where the Kogan falls down a bit is in low light situations, so make sure there is plenty of light when shooting at night. As for still images, the DVC produces surprisingly sharp, clear photos with excellent colour fidelity.

Be aware that the Kogan outputs to .mov files only, but for the low price and overall features, the Kogan is a runaway winner as an entry-level camcorder.

Roberto Romano





Corel Paint Shop Pro

The X2 Ultimate Edition includes more features than ever.

Corel
www.corel.com.au
$159

Everything you could ever need in a photo editing app. ✔

Inevitable bloatware means package isn't lean. ✖

SPECIAL FEATURES
2GB memory stick
Bundled apps and tools

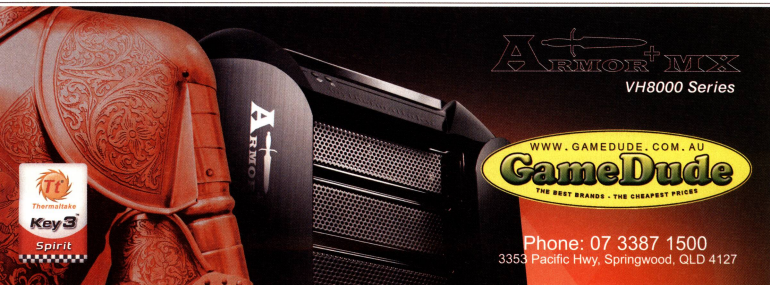
Paint Shop Pro has been a favourite application of ours for a long time, and it's been fascinating to watch its development. Inevitably, features have been added, and — just as inevitably — this has created a larger and not necessarily more responsive package. Now Corel has created an Ultimate Edition, which doesn't just include an updated version of Paint Shop Pro itself, but adds almost every other graphics add-on you can think of. Some are built into the main applications, while others run as stand-alone extras. There's even a 2GB memory stick in the box.

While there's a clear marketing appeal to packing in the features, leaner is often better. Developers may be trying to be helpful, but there's a point at which trying to do too much for users becomes a bad thing. This is highlighted by the way that the core of Paint Shop Pro seems to have been reincarnated as a sub-application in the ExpressLab tool. This includes all of the basic editing features you need, and unlike the main application (which is fast in some places and torturously slow in others), it's efficient and responsive throughout. It also includes a batch mode. It's not clear how often you'd want to apply identical fixes to a folder full of photos, but the option is there if you do. Considering how much ExpressLab can do on its own, it would make a lot of sense to break it out as a separate faster app.

The problem for developers is that photo editing is now very much a solved problem. This seems to have created an irresistible urge to try and keep products fresh with shovelware add-ons and click-bang gimmicks. Photo X2 includes a virtual slimming tool, a tooth whitener, a tanner and a skin smoother. There's probably a market for these, but if you never use them, they just prolong boot time and take up memory.

So there's a good case to be made for modular graphics apps. Adobe has gone down a similar route, shovelling features into Photoshop Elements 7. We'd rather see faster, leaner apps that can be expanded on demand than bloated special editions that try to do everything. The same applies to packaged multiple applications; the MediaOne app included here duplicates many of Paint Shop Pro's basic editing features.

Richard Wentk



BUILDING THE PERFECT CORE i7 PC

USING MULTIPLE CONFIGURATIONS!

APC staff and some of Australia's most prolific professional PC builders pick the best components for entry-level quad-core PCs.

What do I look for?

When building a Core i7 PC. . .

This Skeleton case from Antec is a real beauty when it comes to building PCs "on the bench". If you're a real tinkerer, then having direct access to the components makes things a lot easier.

RAM

Core i7 PCs universally run with DDR3 memory in a three channel configuration (using 3 or 6 DIMMs). We wouldn't build a system with less than 6GB.

CPU

A Core i7 PC needs a Core i7 CPU. Choose from the 920, 940 and 965 models. The 920 represents the best value.

STORAGE

Solid state hard disk drives are the fastest out there, but a high speed mechanical drive offers better value and capacity.

MOTHERBOARD

X58 motherboards are still the go for Core i7. They tend to be pricey, but most offer high-end functionality.

BIOS

ATI 4870 or NVIDIA 280 GTX are the sweet spots for gamers. Save some money here if you don't play a lot of games.

POWER

Always choose a quality power supply. It'll save you hassles with an unstable system, and high-efficiency PSUs will save a small amount on power bills.

The arrival of Intel's new Core i7 and AMD's Phenom II processors has redefined the specs for the state of the art PC. A Core i7 heartbeat needs to be accompanied by a massive upgrade to components that can handle the higher performance of the new CPU, starting with the motherboard and flowing through to things like RAM and even hard disks.

In this cover story, Nick Race's crack team of *APC* PC builders have chosen to review the best-of-breed components for our ideal Core i7 and Phenom II-powered PCs. The components are reviewed on pages 46 to 53.

We've also pulled some of these components together to create our ideal all-round Core i7 PC, pictured right, with which to successfully enter the universe of Core i7.

To highlight that there isn't one way of building a PC, *APC* has also turned to three of the country's premier PC builders. Altech and Enspire for their own versions of a good affordable, and a mid-range Core i7 PC, and games PC specialist GameDude for its suggested specs for a Core i7-based games machine.

APC labs' behemoth Core i7 PC with its hardcore innards exposed!



The APC Labs — Core i7

We put our money where our mouth is and built our dream i7 PC.

The Core i7 PC built by the *APC* team is the one that we would build for ourselves. It's a combination of performance and value. We didn't choose the newest and most-expensive components, but bang-for-buck parts that get you entry into the new quad-core universe without breaking the bank. Also, we wouldn't be satisfied just throwing a whole bunch of components at you and muttering "good luck!" We've taken our own advice and built today's *APC* PC so that you can see how the parts of the Intel Core *i7*-based system come together.

CPU

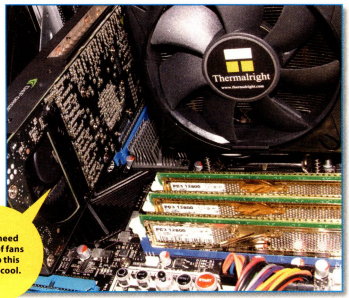
Intel Core i7 920

We've built the system around the Intel Core *i7* 920 processor, the baby of the Core *i7* family, mainly because it matches performance with an acceptable price tag. The 920 at stock runs at what sounds like a slow 2.67GHz. With dual-core Penryn products running at 3.06Hz, including an equivalent-price model at 3.33GHz, it seems like a big jump down, but the improvements in the Core *i7*'s memory management more than make up for the dip in clock speeds. Clock for clock, Core *i7* runs faster than the previous generation, making a direct comparison of little value.

COOLER

Thermalright Ultra-120 eXtreme 1366RT

With the Thermalright Ultra-120 eXtreme 1366RT cooler, we'd expect the system to overclock comfortably up around the 4GHz mark without any concerns about system stability.



You'll need plenty of fans to keep this system cool.

RAM

OCZ PC3-12800 Gold Low-Voltage 6GB Tri-Chan Kit

It may seem like folly to stump up nearly $600 for the OCZ RAM when other tri-channel kits can be had for much less, but the headroom and value it adds to the CPU make it more than worth it; we've essentially paid for a jump in CPU speed. If you decide to forgo the Core *i7* 920 in the future and move to a faster CPU, the RAM will support a newer or faster model, retaining value to a greater extent than other RAM.

MOTHERBOARD

ASUS Rampage II Extreme

The overclocking headroom available in the Core *i7* 920 is very respectable. Our motherboard choice supports this. The Rampage II is becoming the board *du jour* for overclocking enthusiasts, but even a casual overclocker will appreciate the built-in features.

GRAPHICS CARD

Gainward NVIDIA GeForce 295GTX

Our one major extravagance is the

APC'S ALL ROUNDER PC

WHAT YOU SHOULD GET — AND HOW MUCH IT COSTS:

Component	Part	Price
CPU	Intel Core i7 920	Around $475
Cooler	Thermalright Ultra-120 eXtreme 1366RT	$150
Memory	OCZ PC3-12800 Gold Low-Voltage 6GB Tri-Chan Kit	$599
Motherboard	ASUS Rampage II Extreme	$700
Graphics	Gainward NVIDIA GeForce 295GTX	$899
Audio	Integrated Creative X-Fi Solution	$0
Hard Disk Drive	Western Digital VelociRaptor 300GB	$480
DVD Burner	Take your pick	Around $35
PSU	PC Power & Cooling Silencer 750W	$220
Chassis	Cooler Master ATCS 840	$390
Monitor	AOC 619fh 26in LCD Monitor	$699
		Total cost of $4,647

Gainward GeForce 295GTX graphics card. Avid gamers will appreciate its best-in-class speeds, but if this is not a priority for you, then switching it out for any of the other cards we've recommended in our graphics card reviews will shave more than a few dollars off the bill of materials.

HARD DRIVE

Western Digital VelociRaptor 300GB

Keeping within some semblance of sanity, we also gave up on the enterprise class Intel XM-E 32GB solid state hard disk drive. Its price tag (of nearly $1,000) is still extreme, and its limited capacity would also force us to buy a slower, larger drive for storage. Although the Western Digital VelociRaptor is far slower than the latest SSD drives as far as performance is concerned, it still gives us a boost while providing 300GB of storage.

CASE

Cooler Master ATCS 840

Given our desire to overclock hot components and to continue expanding the system in the future, we went with a huge case, the Cooler Master ATCS 840. It's a pleasure to work in. Anyone who's experienced cut or bruised fingers from trying to squeeze a system in to a poorly-made undersized case will certainly appreciate the difference.

APC sees a good chassis as an investment. At home, our cases last through two or three generations of PC systems, still doing their job when the original components are long gone. Putting your money into something you can hang on to and grow in to, is definitely worthwhile.

POWER SUPPLY

PC Power & Cooling Silencer 750W

The same goes for a quality power supply. You give yourself a head start for reliability and longevity with a quality PSU, and the PC Power & Cooling Silencer is a perfect fit for this system. If you can't justify the extra cost involved with this single rail superbly crafted kit, please don't substitute any old cheap and nasty brand from the local PC shop — you'll regret it sooner or later.



APC CORE i7 PC ASSEMBLY

The order of assembly.

Building the *APC* PC i7 was a relatively simple affair. The features built into the Cooler Master ATCS 840 case made life easier. For instance, after removing the empty motherboard tray, we installed the motherboard standoffs using a handy paper sheet attached to the tray. The motherboard attached to the tray, we inserted the CPU and began to attach the cooler.

Some readers will throw their hands in the air right now. Many larger coolers use a back plate behind the motherboard that needs to be attached before the board can be installed in the case or on a motherboard tray. This particular tray includes a cutout behind the CPU area, letting you swap it out without having to take apart the entire system and unscrew the motherboard. It's the little things…

The CPU cooler was attached, memory installed in alternate slots and the 295GTX graphics card and audio card from the motherboard kit seated next. We then connected the chassis front panel connectors to the ASUS Q-Connector, essentially a pin block designed to take the wires from the chassis front panel and slot on to the equivalent pins on the motherboard. It's another little thing, but it means no more peering into deep cases to rewire the board in if you need to take it out for any reason.

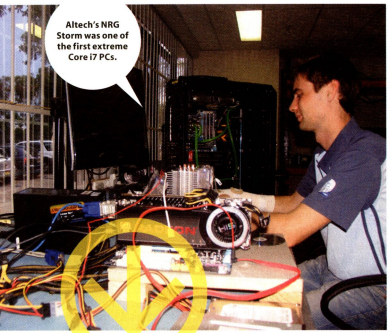
At this point we installed the hard disk drive and optical drive into the chassis. This chassis includes plastic drive cages for 3.5in hard disk drives, so no more screwing drives in, just bend the plastic cage around the drive and it's held in handily. Back access to the drives with plenty of room for SATA and power cables means rigging it up is easy, as well as keeping the wires out of the front of the case where you usually need to work. The PSU slotted into the bottom mounting position next, and wires routed behind where the motherboard tray will sit, to keep it tidy and maximise air flow.

With drives in place, we slid the motherboard tray and components in, and plugged in the power to the motherboard and graphics card. A quick cable routing job later to run power up to the hard disk drive and optical drive, slotting the Q-Connector on the pin headers and powering the fans off the PSU and we were done.

Vista install came next, with drivers off the motherboard's disk sufficient to get us online for more recent driver versions. A few reboots later and we were running full speed ahead.

We threw PCMark Vantage and 3DMark Vantage at the new system. PCMark Vantage was our first run, with the system scoring a very respectable 6,871. Not a bad start. With some tweaking and overclocking, 7,300 to 7,400 should be in sight.

3DMark Vantage was run next, to stress out our 295GTX. A score of 19,831 was a pleasant surprise, with the GPU component at 16,981 and CPU at 39,936 — we were laughing. If only we could take it home from the Labs!



ALTECH'S AFFORDABLE PC

THE CORE i7 SETUP ALTECH RECOMMENDS:

Component	Part	Price
CPU	Intel Core i7 920	$475
CPU cooler	Thermolab	$75
Motherboard	Gigabyte GA-EX58-DS4	$340
RAM	Corsair TR3X3G1333C9 3GB (1,333MHz)	$165
Graphics	HIS ATi 4850 512MB	$260
Audio	Onboard	$0
Hard drive	Hitachi 1TB DeskStar 7K1000	$220
Optical drive	Sony BWU300S HD Ready Internal SATA Blu-ray burner	$470
PSU	Antec TP-550	$150
Case	Antec Nine-Hundred-Two	$230
Monitor	BenQ E2200HD 21.5in Full HD Widescreen LCD Monitor	$250
		Total cost of $2,635

Altech Computers — Core i7

Altech explains its choices for Core i7 components.

Altech Computers Corporation distributes components and pre-built systems. Its Altech NRG PCs regularly push the envelope of performance and regularly win Editors Choices in our reviews section, so we asked the company's brightest PC engineers to spec out an affordable Core i7 PC that would be a great entry into the world of quad-core computing.

CPU

Intel 920 Core i7

As we all know Intel released the new Nehalem range of processors, which now have the memory controller integrated on the chip, hyper-threading technology, QPI bandwidth and turbo mode. The 920 processor has plenty of overclocking potential and our labs have proven it to be stable at 3.6GHz on air cooling.

CPU COOLER

Thermolab BARAM

The Thermolab BARAM heat sink uses a combination of pure copper, aluminum and the positioning of the fins and heat pipes to provide optimum heat extraction and cold air flow throughout the unit. It supports: Intel 775, 1366CPUs, AMD AM2/AM2+, AM3 and the option to attach a 120MM fan. Our lab tests have proven that the Thermolab BARAM keeps the processor cool even at high loads.

MOTHERBOARD

Gigabyte GA-EX58-DS4

We found the Gigabyte a perfect foundation for our Core i7 PC's components. Gigabyte offers great reliability, stability and overclocking, plus features such as Dual BIOS, Dynamic energy saver program, up to 12 USB ports, RAID, Triple Channel DDR3 memory support up to 2,100+ MHz and 3-way CrossFireX.

RAM

Corsair TR3X3G1333C9 3GB (1,333MHz)

This memory is reliable and stable, using XMS technology heat spreaders to keep the memory chips cool, effectively prolonging the lifespan of this memory.

GRAPHICS CARD

HIS ATI 4850 512MB

It provides power for gaming, superb, quiet cooling and features such as HDMI to support 1,080p as well as openGL 2.1 and DirectX 10.1. This is a great all-rounder at this competitive price point.

AUDIO

Integrated Audio. We decided to stay with the integrated audio chipset 'Realtek ALC888 codec' found on the Gigabyte motherboard. It provides superior sound quality and supports up to 7.1 channel High definition Audio. This motherboard also allows for S/PDIF in and out. With all these features, you are assured to be satisfied.

HARD DRIVE

Hitachi 1TB DeskStar 7K1000 (3.5in SATA 3.0GB/s HDD, 32MB, 7,200RPM)

Hitachi hard drives are proven to be reliable in both normal and RAID environments, and with a generous 1TB of storage for this setup. Such storage provides plenty of space for movies, music and games.

OPTICAL DRIVE

Sony BWU300S HD Ready Internal SATA Blu-ray burner

The Sony drive caters for all individual optical media like Blu-ray, DVD, CD reading and recording. Helps make your PC a full-on multimedia device.

PSU

Antec TP-550

The Antec True Power 550W PSU is highly efficient, stable and reliable. It caters for gamers through to energy-conscious users.

CASE

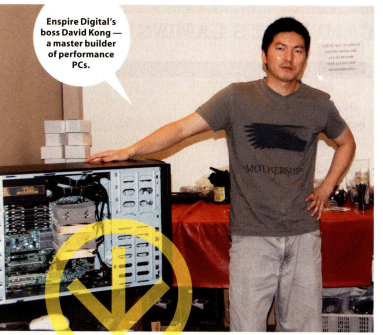
Antec Nine-Hundred-Two

The Antec Nine-Hundred-Two has improved air flow from a 200mm fan placed on the top of the case, enough space for two 120mm fans in the front and one additional 120mm fan on the side panel for even better cooling.

MONITOR

BenQ E2200HD 21.5in Full HD Widescreen LCD Monitor

BenQ offers 5ms response time (2ms GTG), resolution up to 1,920 x 1,080, Dynamic Contrast Ratio 10,000:1, speakers, HDMI input and the world's first 21.5in Full HD 16:9 LCD monitor. It's ideal for all your personal entertainment.



ENSPIRE'S MID-RANGE PC

THE CORE i7 SETUP ENSPIRE DIGITAL RECOMMENDS:

Component	Part	Price
CPU	Intel Core i7 920	$475
CPU cooler	Thermalright Ultra-120 with the 1366	$130
RAM	Kingston 6GB Kit	$180
Motherboard	ASUS P6T	$370
Graphics	1GB Radeon HD4870 GDDR5	$490
Audio	Onboard	$0
Hard drive	32GB SSD, 1TB data HDD	$640
Optical drive	LG Blu-ray/HD-DVD Combo Drive	$170
PSU	Gigabyte Odin 800W	$230
Case	Antec P182	$220
Monitor	Samsung 2443BW	$440
		Total cost of $3,345

Enspire Digital — Core i7

Taking a different tack, Enspire builds its Core i7 machine.

Enspire Digital is a system builder specialising in high-end gaming systems, media centre systems and digital content creation workstations. Like Altech, its systems are regular winners of our Editors Choice and Highly Recommended awards. Some of our staff have actually paid real money for their PCs. We asked Enspire to build us a good, mid-range PC that enables Core i7 computing.

CPU

Intel Core i7 920

Cheapest Core i7 and very easy to overclock. We can reach 3.6GHz on a good air cooler very easily.

CPU COOLER

Thermalright Ultra-120 eXtreme 1366RT1366

Best Core i7 cooler on the market. We chose the bolt through kit as we can pick the type of fan. We used Noctua fans for quiet systems and Panaflow fans for high overclocks.

MOTHERBOARD

ASUS P6T

Provides support for both socket 775 and socket 1366 coolers. Also overclocks quite well and has passive cooling. Higher-end models have more PCI-E lanes for multi graphics cards, but this board is sufficient for most of our systems.

RAM

Kingston DDR3 6GB Kit

Excellent value, and works without any BIOS tweaking. Latencies are not very good but it does not require extra voltage to run. When overclocking we tend to run memory at or below their rated speeds. If customers want faster speeds than 1,333MHz another option we've found is OCZ.

GRAPHICS CARD

1GB Radeon HD4870 GDDR5

Offers good value and performance. Runs a bit hot, but most cards that we use have a non-standard cooler. The motherboard supports CrossFire, so if extra performance is needed you can add a second graphics card.

AUDIO

For customers who are connecting to sound systems using SPDIF or HDMI, the onboard sound is fine. For customers with a set of quality speakers, we recommend the X-Fi Titanium PCI-E card. It's has EAX support and a decent-quality DAC.

HARD DRIVE

320GB SSD, 1TB HDD

We recommend running dual hard drive setups for our tech savvy customers. This helps separate the OS from data, which makes backing up and restoring the system easier. For customers with bigger budgets we're recommending SSD drives for the OS as it seems to make the system much snappier.

OPTICAL DRIVE

LG Blu-ray/HD-DVD Combo Drive

With high-definition content becoming more widespread and available on Blu-ray, having a Blu-ray drive to watch content is a nice feature. The LG drive supports both Blu-ray and HD-DVD, and whilst HD-DVD lost the format war, discs can be bought very cheaply and offer the same picture quality as Blu-ray. As an added bonus the bundled version of PowerDVD 7 that comes with the LG drive can be upgraded to support 6-channel audio (most versions that are bundled only support 2 channels).

PSU

Gigabyte Odin 800W

We chose this because it's a heavy duty power supply with modular cables, and a very low failure rate. This unit is also very quiet. The Gigabyte Odin is larger than most standard ATX units, so it does get a bit cramped inside the case.

CASE

Antec P182

This has been our standard high-end case for some time. Whilst the front door hinges are a bit flimsy, the case offers the best combination of cooling and noise, with speed-adjustable fans and a three-layered panel construction to dampen internal noise. It also supports large graphics cards like the Radeon 4870X2 and GeForce GTX 295, which many cheaper cases struggle to fit.

MONITOR

Samsung 2443BW

Samsung offers the best warranty in the industry and its panels aren't bad either. This 24in monitor is very affordable now and offers a good spec level for the money.



GAMEDUDE'S GAMING PC

THE CORE i7 GAMING SETUP GAMEDUDE RECOMMENDS:

Component	Part	Price
CPU	Intel Core i7 920	$475
CPU cooler	Stock cooler supplied	$0
Motherboard	MSI ECLIPSE with X-Fi sound card	$580
RAM	Corsair DOMINATOR Triple Pack (6-gig) 1600Mhz Cas 8	$430
Graphics	ATi 4870X2 x2 or NVIDIA SLI GTX 295	$800
Audio	Onboard	$0
Hard drive	SSD 60GB boot drive + 2x Western Digital VelociRaptor 300GBs for RAID 0 Stripe	$1,400
Optical drive	LG Blu-ray/HD-DVD Player	$170
PSU	Gigabyte Odin 800W	$230
Case	ThermalTake Spedo	$290
Monitor	Acer G24	$630
		Total cost of $5,000

GameDude — Core i7 gaming

All-out gaming performance in GameDude's Core i7 choices.

GameDude Computers specialises in gaming PCs and also builds home office PCs. It has a wealth of industry experience, so we asked its builders to spec an ideal Core i7 gaming rig.

CPU

Intel Core i7 920

Price vs performance are the benefits of this CPU. Given the FSB/QPI of the 920 and 940 is 4.8GT/s and the 965 is 6.4GT/s, and the speeds are 2.6GHz, 2.9GHz and 3.2GHz respectively, there is plenty of headroom for overclocking the 920 without stressing the system. Given the price is currently double for even the next model it's wiser to use the spare dollars elsewhere.

CPU COOLER

Stock cooler supplied

Intel designed the heatsink to perform in a large variety of conditions, so unless you are extremely overclocking your system it makes little sense to buy a cooler at the moment.

MOTHERBOARD

MSI ECLIPSE with X-Fi sound card

While all X58 motherboards use the same chipset, the extras you get are what pushes this one to number one. Having a Creative X-Fi sound card that supports EAX 5 will help with performance. This board also fully supports ATi CrossFire and NVIDIA 3-way SLI.

RAM

Corsair DOMINATOR Triple Pack (6GB) 1600MHz Cas 8

The DOMINATOR series has nice big heatsinks attached to the RAM; this will help greatly in your quest to tweak your system to full potential. Keeping RAM cool is key to stability, and with a rated speed of 1,600MHz at CAS8 there is a lot of potential to play with in regards to speed and timing mixes. While there is RAM listed at CAS7, the price premium is not worth it — slow 1,600MHz CAS8 RAM down to 1,366 and you could probably run CAS 7 anyway.

GRAPHICS

ATI4870X2 x2 or NVIDIA SLI using GTX 295

OK, maybe in this case I didn't pick a solution, but there is a very good reason... both configurations are extremely good and both have some drawbacks. As such you need to decide yourself how you want your gaming rig to be.

AUDIO

Onboard

Onboard Creative X-Fi — not Realtek audio.

HDD

SSD 60GB boot drive + two Western Digital VelociRaptor 300GB/s for RAID 0 Stripe

SSD is fast but expensive for the size — it makes a good drive for your OS but not so good for games, as it will quickly fill up the drive and that's not good. Two Raptor 10,000RPM drives in RAID 0 will be very fast and, with a capacity of 600GB, will be fast enough for most of this year's games in respect to transfer of larger game files.

OPTICAL DRIVE

LG Blu-ray/HD-DVD Player

Really, if you can afford a big gaming system, you can afford a Blu-ray player — they all support DVD-RW functions and play Blu-ray discs as well. While no games will be supplied on Blu-ray for a while, it's nice to have the technology ready, and you can watch Blu-ray movies!

PSU

ThermalTake 1500w model W0171RE

Because you don't ever want to run out of power, especially with 3 x 295s. It also comes equipped with the correct amount of PCI-E power headers, both 8- and 6-pin, for your video cards, reducing the mess created by using adaptors, and the unit has cable management, so you only use the cables you need.

CASE

ThermalTake Spedo

Mainly this will be based on style/looks, but we recommend the ThermalTake Spedo because of its fantastic air cooling. This case has room to fit everything a gamer needs and will keep it running cool.

MONITOR

Acer G24

A monitor designed specifically for gaming, with specs to match. Super fast 2ms response with 50,000:1 contrast for extra detail in dark areas with better colour depth. In the visual stakes it's important to not compromise — a lesser monitor will affect your gaming whether you realise it or not.

HURRY! LAST CHANCE TO WIN $26,000+

Money

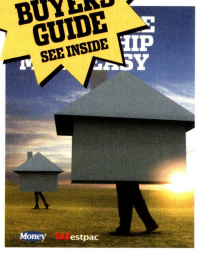
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Intel Core i7 920

The most advanced quad-core processor as yet.

Across the benchmark spectrum the Core i7 processors are 15%-45% faster clock-for-clock than the older Intel Core 2 Quad processors and AMD's Phenom and Phenom II processors. Based on Intel's Nehalem micro-architecture, the 920 is the baby of the Core i7 lineup, with the 940 and 965 Extreme Edition ranking above it. But unlike the 940 and 965 Extreme Edition, the 920 is actually affordable.

Made from a 45nm manufacturing process, the Core i7 920 is stock clocked at 2.66GHz using a 20x multiplier and a 133MHz bus frequency.

While the multiplier is only downwards unlocked, the Core i7 range has a turbo feature. Under correct thermal conditions and put under some form of computational load, the processor will raise the multiplier above the stock 20x for additional frequency. For processing tasks needing two to four cores the multiplier can raise to 21x (effectively offering an additional 133MHz frequency per core) and if just one core is being utilised the multiplier will raise by two increments to 22x (offering an additional 266MHz). Basically, these chips auto-overclock when they're put under load.

While the Core i7 has less cache — 8MB cache instead of the 12MB found on the Yorkfield based Core 2 Quads — it manages quite well because of its extremely efficient micro-architecture.

The stock QPI (QuickPath Interconnect, or connection from processor to input/output hub) frequency for the Core i7 920 is 4.8 giga transfers per second (GT/s), the same as the Core i7 940 (the 965 Extreme Edition operates at 6.4GT/s). Interestingly, in many of the quality Core i7 motherboards on the market, the stock 4.8GT/s of the 920 can quite effortlessly be increased to 6.4GT/s — a neat little bonus.

Speaking of bonuses, while the Core i7 920 does operate at a rather high TDP (Thermal Design Point) of 130W, if you can keep the heat under control there's plenty of overclocking headroom in these processors. With some bus frequency tweaking, these chips can be pushed to between 3.6GHz and 4GHz for 24/7 safe operation. Not bad for the baby of the bunch.

Intel
@ www.intel.com

✔ Good performance; upgrade path.
✖ Runs hot at 130W TDP.



AMD Phenom II X3

The 720 Black Edition includes a triple-core option: nice.

The triple-core Phenom II X3 720 is based on the same micro-architecture as the Phenom II X4 quad-core range. Well actually, it's a Phenom II X4 with one core disabled, and as such it comes as no surprise that in single-threaded applications it pulls the same kind of performance clock-for-clock as its quad-core brethren.

This processor helps close the gap between the Athlon X2 and the Phenom II X4 ranges in the AMD family. Clocking in at 2.8GHz it's equivalent in frequency to the similarly-paced Phenom II X4 920, but avoids the heat spike to a 125W TDP by functioning with only 3 active cores. It slots the X3 720 into a gap between the X4 920 and Athlon X2 ranges when it comes to performance per watt.

With one of the cores deactivated, the total L2 cache decreases from 2MB to 1.5MB, however with the L3 cache being separate to the actual processing cores, the chip as a whole still maintains a total of 6MB of L3 cache. This is good news for gaming performance as CPU cache can have a direct impact on the FPS rate of the overall platform.

Not only this, but most games that are 'multi-core aware' are only optimised for dual-core operation and as such the X3 720 brings the micro-architectural efficiency of the Phenom II design and high frequency of 2.8GHz while maintaining a decent TDP rating and full L3 cache functionality.

With its AM3 socket the Phenom II X3 720 also represents the next generation of processors from AMD. This socket is based on a 938-pin organic micro pin grid array (micro-PGA) and is backwards-compatible with the 940-pin micro-PGA setup of the socket AM2+ platforms. As such, this processor will function without issue with AM2+ based platforms based on AMD chipsets, such as 790FX and 790GX as well as future AM3 specific motherboards.

This backwards compatibility means the processors supports up to DDR2-1066 and DDR3-1333 grade memory (though both can run higher with overclocking), the final jewel in the crown that makes this processor an upgrader's best friend. Oh, and it's got a fully unlocked multiplier and overclocks up to 3.5+GHz with relative ease!

AMD
@ www.amd.com

✔ Good overclocker; socket AM3 compatible.
✖ Only 1.5MB of L2 cache.



AMD Phenom II X4

The AMD CPU for those who love overclocking and appreciate value.

The king of AMD's green hill, the Phenom II X4 940 is stock clocked at 3.0GHz wrapped in a 125W TDP and sporting a total 2MB of L2 cache and 6MB of L3 cache. This is a marked improvement over the previous top chip, the Phenom X4 9350 stock clocked at 2.6GHz and with only 2MB L3 cache.

This latest generation, the Phenom II X4 brought with it not only more L3 cache and higher stock frequency within the same TDP envelope, but the biggest changes were on a micro-architectural level. Not only did these changes increase overall efficiency but the frequencies that are now obtainable are far beyond that of the previous generation.

For those with a taste for overclocking the Phenom II X4 can operate between 3.6GHz and 4.0GHz on quality air cooling in a stable 24/7 environment. This is a strength that previous Phenom processors could only dream of.

With a completely unlocked multiplier and sizeable frequency headroom, the Phenom II X4 940 is the shot in the arm AMD needed to get back in the game. Significantly cheaper than Intel Core 2 Quad and Core i7 for creating a complete platform, this leads to the Phenom II X4 940's backup guard; the Dragon platform, a marketing initiative by AMD to sell the combined power of its CPU, motherboard and graphics cards.

At the heart of the Dragon platform lies a Phenom II X4-based processor, AMD 790GX-based chipset and a HD4800 series GPU. The platform's cost is significantly lower than the Intel equivalents, eg. Core i7 920, Intel X58 chipset and HD4800 series GPU.

Interestingly, a Dragon platform will maintain just as many frames per second in Crysis as a similarly outfitted Core i7 platform. This is definitely something to keep in mind if you're building a gaming-specific system and feeling the economic pinch.

While there's no denying that the Core i7 micro-architecture is faster and overall more efficient than the Phenom II micro-architecture, the difference between one or the other will ultimately come down to both price and whether or not you're actually going to utilise the full potential of the more expensive Intel platform.

AMD
www.amd.com

✔ New 45nm process; great overclocker; good value.
✖ 125W is getting a tad warm.



Intel Core 2 Duo

Not a quad-core, but still a standout from previous dual-core CPUs.

To many computer enthusiasts, the champion of Intel's Core 2 Duo range, the E8600, will go down in the history books adjacent to the page on Intel's Celeron 333.

Based on Intel's 45nm Penryn micro-architecture (codenamed Wolfdale for dual-core processors), the E8600 is a stock 3.33GHz processor running on a 333MHz FSB (1,333MHz quad pumped) paired with a downwards unlocked 10x multiplier. This chip also sports 6MB of L2 cache and manages to operate at 3.33GHz within a 65W TDP envelope.

Upon release the Core 2 Duo E8600 was lapped up as a super chip by the overclocking enthusiasts. With a slight bump of the FSB, or a bit of a drop of the multiplier and a fair pump up of the FSB, these chips could be made to run all day in stable configurations of 3.6GHz and up to 4+GHz.

For those not so keen on overclocking, the stock 3.33GHz offers the fastest and most efficient dual-core processor on the market. However, for the privilege of being the fastest dual-core processor, the E8600 does come tagged with a price premium to the tune of around $420.

If this is an issue for you — and we can all agree money isn't exactly growing on trees right now — the other two options within the lineup are much more affordable.

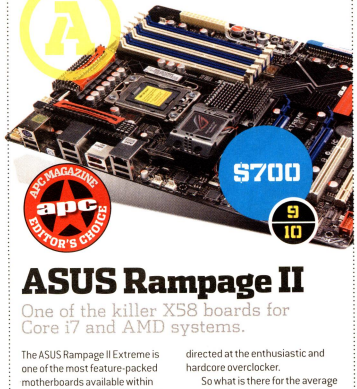
The Core 2 Duo E8400 and E8500 go for roughly $250-$300 right now and are stock rated for 3.0GHz and 3.16GHz respectively.

While the lower multipliers will indeed impact overclocking capability, paired with a quality P45-based motherboard, such as the Biostar TPower I45, these chips can quite effortlessly reach 3.6+GHz barriers for stable ongoing operation.

The end of the ongoing Core 2 Duo legacy started with the initial launch for the Core micro-architecture. Although these chips are only dual-core offerings, they're still extremely potent and often a great choice for gamers, as games are yet to utilise more than two cores en masse.

Intel
www.intel.com

✔ A known quantity; proven design; 65W TDP.
✖ Obsolescence is creeping up.



ASUS Rampage II

One of the killer X58 boards for Core i7 and AMD systems.

The ASUS Rampage II Extreme is one of the most feature-packed motherboards available within any segment of the market: AMD, Intel, socket AM2+, socket 1366. Whatever you want to compare it against, this board is overflowing with features.

A part of the Republic of Gamers series (R.O.G.) this motherboard also gets slapped with a premium price. While this has been debated heavily on previous R.O.G. boards, there's an acceptance that it does have that next level of performance and features.

As would be expected from such a high-end board, the layout is second to none. The SATA ports are neatly packaged in the lower right corner and tweaked to the side, as is the EIDE port, while above this are the TweakIT controls, a built-in hardware-overclocking finger-tweakable system for pushing the overclocking limits and making fine adjustments.

To make the tweaking experience that little bit safer, the Rampage II Extreme also includes a derivatively-named probing feature called ProbeIT. Though truth be told, again it's more directed at the enthusiastic and hardcore overclocker.

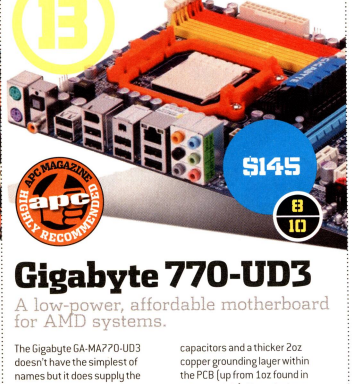
So what is there for the average user? Well, to make things easier the BIOS has a built-in 'CPU level up' feature which allows for the truly clueless to simply hit enter upon selecting the chosen boost and letting it go. While this does make us feel unnerved, it's the combination of research and this feature which can actually lead to a very simple yet still effective overclock.

Packing out the finer hardware-based features, the Rampage II Extreme supports both ATI CrossFireX and NVIDIA 3-Way SLI. Also on the list of impressive features is the support for DDR3-1600 triple-channel memory at stock and DDR3-2000 triple-channel memory under overclocked conditions. Additionally the motherboard is accompanied by an add-in audio card called the SupremeFX X-Fi, which, as the name infers, is based on Creative X-Fi technology.

The ASUS Rampage II Extreme is a hardcore board for the most hardcore of tech enthusiasts; not just overclockers and gamers.

ASUS
@ www.asus.com

✔ Hardware-based overclocking control; solid build.
✖ Far from simple; far from cheap.



Gigabyte 770-UD3

A low-power, affordable motherboard for AMD systems.

The Gigabyte GA-MA770-UD3 doesn't have the simplest of names but it does supply the simplest of features and layout while still assuring high quality in an otherwise average price range.

The *APC* choice for a low power, low-end platform, this motherboard forms the basis of a system which is up and running on a tight budget and has room for expandability.

The GA-MA770 offers full support for the whole AM2+ based range and Hyper Transport 3.0 support which allows for functionality with everything from the low-end Athlon X2 processors all the way through to the high-end Phenom II X4 processors. This board even has next-generation support for the backwards-compatible socket AM3 processors as well as support for 140W TDP based processors.

It also features six SATAII ports, of which, four support RAID functionality in the form of RAID 0, 1 and 0+1; plenty of options for your storage needs.

The GA-MA770-UD3 maintains high quality. This is done through the use of 100% solid state capacitors and a thicker 2oz copper grounding layer within the PCB (up from 1oz found in other models). Not only does this make the PCB stronger and reduces flex and warping over time, it also results in a cleaner internal power management and cleaner separation between layers of the PCB and thus the copper traces used to transmit signals throughout the board.

Expandability and upgrading potential is always on the mind of users, particularly those trying their best to string out a buck or two. As such the GA-MA770-UD3 has a varied number of options for add-in cards. Once upon a time a motherboard with four PCI-Express x1 slots would be deemed as having too many. Instead the GA-MA770-UD3 opts for four PCI-Express x1 slots while still having the option of two PCI slots; in doing so it demonstrates forward thinking towards the future and expanding markets.

For quality, numerous upgrade options and a strong list of features, the GA-MA770-UD3 is simply the motherboard for this category.

Gigabyte
@ www.gigabyte.com.tw

✔ 2oz copper layers; quality build and components.
✖ Quite basic features.



Gigabyte MA790GP

790GX chipset for Phenom II top-end performance.

The Gigabyte GA-MA790GP-UD4H is a second-generation motherboard based on the AMD 790GX chipset. The first generation was the GA-MA790GP-DS4H but this newest generation sees the implementation of Gigabyte's Ultra Durable 3 standard, which features stronger and more efficient 2oz copper layers.

Other changes include more attention to the SATA port location and orientation — on the older GA-MA790GP-DS4H the top four SATA ports can be potentially blocked by a long graphics card — but now the top four ports have been relocated to a 90 degree angle on the lower right edge of the motherboard.

Around a hundred dollars more expensive than the lower model, the GA-MA790GP-UD4H has extra features and components.

First on the list is the use of the SB750 Southbridge in preference to the lower-spec and older SB700 Southbridge. One of the bonuses of this implementation is the capability to set a RAID setup across all six of the SATAII ports, not just the first four. Additionally, these RAID setups can be configured for RAID 0, 1, 5, 10 and even JBOD.

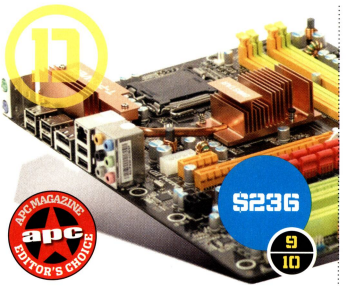
The next and perhaps the most obvious feature when looking at the two motherboards is the two PCI-Express x16 slots on the GA-MA790GP-UD4H; this allows for CrossFire between two discreet GPUs as well as CrossFire between a single discreet GPU and the onboard GPU built into the AMD 790GX chipset.

And this brings us to notable addition number three; the built-in HD3300 GPU within the AMD 790GX chipset. This allows for many options. These options include running from the onboard HD3300 outputs (D-Sub, DVI-D or HDMI — all found on the rear I/O panel) for a lower power consuming graphics processor for activities such as word processing or web surfing. If more power is wanted, the chipset can be put in a CrossFire configuration with one or two discreet ATI GPUs to further increase the system's graphics processing power.

In effect, just these three features make for a strong case to purchase this motherboard even as a low-level platform to remove the cost of a discreet GPU as well as to promote high-end potential power with future upgrades.

Gigabyte
www.gigabyte.com.tw

✔ 2oz copper layers; 790GX; redesigned layout.
✖ Needs more SATA ports; onboard graphics not great.



Biostar TPower I45

A highly overclockable board for Intel dual-core machines.

The Biostar TPower I45 is a high-quality, well-designed board that reflects Biostar's continual research and development, particularly with BIOS. Add the inclusion of 100% solid state capacitors, full use of the ICH10R Southbridge SATA and RAID support, full implementation of the P45 chipset's CrossFire functionality and high FSB scalability, and you start to get a picture of an outstanding feature-rich motherboard.

But it's the FSB scalability that brings us to perhaps the main reason to consider the TPower I45 in a cheaper Core 2-based system build. It ticks all the boxes in regards to features but this was also the board that overclocking Team Australia achieved a stunning 734MHz FSB frequency — up from a stock 333MHz FSB. While this was indeed done under the lunacy of liquid nitrogen cooling, with quality air cooling and a bit of research and understanding, it is quite easy to manage a stable 450-550MHz FSB.

In effect, a high FSB will increase memory bandwidth through-put as well as bandwidth to chipset orientated areas such as the PCI Express bus.

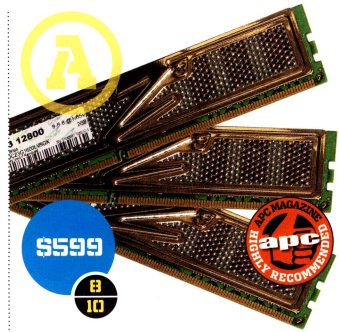
The motherboard also has an extremely clean component layout, which allows for the six SATA ports to be set to a 90 degree angle. This avoids any potential collisions between the SATA cables and longer GPUs such as the high-end units found in both the ATI and NVIDIA ranges.

Smart design doesn't stop with SATA port orientation. The cooling of the board's vital components is done by understated yet effective cooling solutions. However if the temperatures do get a little out of hand, there is an optional heatpipe and fan assisted add-on cooler which straps onto the MOSFET heatsink.

With the technology scene feeling much of the brunt of the world's and nation's financial situation, now more than ever it's important to consider areas where you can get more for less. Overclocking (with a little time taken to do some research) is the easiest way to get that little extra bang for your buck. And by selecting components with this potential in mind, the Biostar TPower I45 truly is a stunning piece of kit.

BioStar
www.biostar.com.tw

✔ Solid caps; high-quality board; improved BIOS.
✖ Takes time and knowledge to get the most out of it.



OCZ PC3-12800 Gold 6GB Tri-Chan

High-end memory for high-performance systems.

There's no doubt that if you're looking at buying a high-end X58 system, a 6GB kit of triple-channel memory should be on top of your shopping list. But with so many brands with different speeds out there, it can be quite difficult to find the kit that's perfect for you.

Most kits at the moment come down to three speeds. They start at a basic 1,333MHz, rise to 1,600MHz and then go all the way up to 2,000MHz for extreme users. The biggest problem with these kits is that for the most part they are only available in 3GB capacities.

The OCZ PC3-12800 Gold Low-Voltage 6GB Tri-Chan Kit comes in both 3GB and 6GB form, with a stock speed rating of 1,600MHz. Timings are quite decent at 8-8-8-24, sitting between those of entry-level kits and the extremely high-end kits that carry even higher price tags.

As with all triple-channel kits, the 1.65 recommended volts is below the 1.8 volt rating found on older dual-channel kits which were aimed at X48 users.

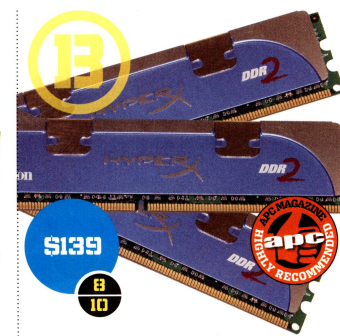
Under synthetic benchmarks we can see that the extra MHz on offer and the lower timings give the edge over 1,333MHz kits.

Moving to real-world applications, however, doesn't really show us any healthy gains from the extra speed. This isn't uncommon, though. What the extra MHz on offer gives you is the ability to overclock your CPU higher, which is where the biggest performance gains are seen.

If you're interested in overclocking and really want to extract more performance out of your new computer without spending bucketloads of cash, the 6GB OCZ Gold kit is a good choice that doesn't carry the $800 price tag of the even higher-clocked and lower-latency memory.

PC Maniacs
www.pcmaniacs.com.au

✔ Good overclocking potential; good timings.
✖ Costly compared to entry-level kits.



Kingston HyperX PC6400 4GB Kit

Aggressively priced DDR2 memory with respectable timings.

With most enthusiast users concentrating on DDR3 pricing these days, people have forgotten that DDR2 is becoming very aggressively priced and still worth considering. Moving from a 2GB kit to a 4GB one can yield some fantastic performance gains in many situations. With low-latency kits setting you back less than $150, DDR2 is a great upgrade path.

The HyperX series of memory has always been Kingston's flagship module family, and the Kingston HyperX PC6400 4GB kit consists of two modules of 2GB each. The timings of 5-5-5-15 at 1.85 Volts are not the most aggressive timings we've seen from modules rated at 800MHz, but are still nice nonetheless.

The thing about this particular kit is the fact that there are really no frills here. It's a good-quality kit that runs at respectable timings at the more common 800MHz speed that most DDR2 users have become accustomed to. And it's all done at a very good price.

While it lags behind new systems that use $600 6GB triple-channel DDR3 kits, it offers better performance than basic 800MHz DDR2 kits without the big price tag that the higher-end 1000MHz+ modules carry.

If you find yourself wanting some good-quality PC6400 modules that carry a brand name recognised globally, the 4GB HyperX kit from Kingston is one well worth looking at.

While it doesn't have huge heatsinks or fancy LEDs like some of the louder modules out there, the Kingston HyperX kit offers good performance at a very good price point.

If you're not quite ready to make the jump to DDR3 yet or simply can't warrant the increased price the technology carries, the move to a new 4GB kit of DDR2 could be one of the best you make.

Kingston
www.kingston.com

✔ Good all-round kit.
✖ Not the cheapest 6400 modules.



Chaintech APOGEE GT DDR2-1150 4GB

Another kit that shows that DDR2 still has a place in the market.

If you compare the cost of a high-end DDR2 kit like this Chaintech APOGEE GT 1150 kit, which offers 4GB of memory at 1,150MHz for $250, to a high-end DDR3 6GB kit at 1,600MHz which can be had for anywhere from $600 to $800, you can clearly see the reason why performance DDR2 is still a serious performance option.

Chaintech has been around for ages and made its name in the motherboard market many years ago, but these days the company concentrates on graphics cards and anything memory-related, which includes everything from DDR2 to solid state drives.

This particular kit is one of the higher-clocked DDR2 modules on the market, with a stock clock speed of 1,150MHz, way up on the 800MHz of most kits. Like most high-speed memory the relaxed 5-5-5-15 timings at 2.1v are the most common tradeoff for more speed.

As far as looks go there isn't really anything we haven't seen before, while the heatsink has fins protruding from the top of the module, the increased heat output shouldn't cause any problems. Placing the modules into our testbed they fire up at 800MHz as you would expect, the1,150MHz at 2.1v achieved with overclocking.

Where we see the biggest gains from the extra speed on offer is when we overclock our CPU. With an extra 300MHz available from our Intel Core 2 Quad Q6600 machine thanks to the higher memory speed, we get a good boost for everthing from games to CPU intensive applications.

For some the thought of spending $250 on old DDR2 technology is going to be hard to swallow, but if you're not ready to outlay the big dollars associated with moving from a Core 2 DDR2 system to a Core i7 DDR3 one, it's easier to bear. If you can handle the cost associated with this kit and you want to overclock you're not going to be disappointed.

Chaintech
@ www.kingston.com

✔ Good performance.
✖ Expensive for DDR2; 1,150MHz is Max OC.



Kingston Triple Channel 1333MHz

3GB triple-channel memory with a low price tag and good performance.

When it comes to appearance, this set of DDR3 RAM comes without the bright LEDs and towering glued on the heatsinks of some other brands. But its low price tag does not mean you should have low expectations. What memory really comes down to is how it performs rather than how it looks

At first, everything about this Triple Channel Kit seems staid. Its 1,333MHz DDR clock is considered the bare minimum by most users of the X58 chipset and the single-sided design means there's only 3GB of memory on hand. While six years ago that was an impressive amount, it doesn't seem as much these days. The timings of 9-9-9-24 at 1.5 volts are also not particularly outstanding.

But these are the sacrifices you make when you're trying to stick to an extremely strict budget. This kit is part of the Value RAM series from Kingston and to be completely honest it's surprising to hear the word "value" in a 3GB triple-channel kit. That's why we like it.

Performance is one of the most interesting aspects of this kit. In the synthetic world of benchmarks the kit lags behind the high-end OCZ kit that costs almost four times the amount. But in the real world there is little difference to be seen, this despite the lesser speed and half the memory capacity on offer. The best gains under Vista are seen when moving from 2GB to 3GB and while the extra 3GB on top of that offers excellent performance for people who are heavy multi-taskers, gamers will find that the performance on this kit is still excellent.

A DDR3 triple-channel kit for the X58 platform doesn't have to be expensive and this kit is a testament to that. It's a fantastic option for people who want to jump on the X58 bandwagon without forking out the wads of cash for some of the top 6GB kits. This kit says you can have good performance on a tight budget.

Kingston
@ www.kingston.com.au

✔ Value for money is second to none; performance.
✖ No heatsink; very plain; unexciting timings.



Gainward GTX 295

Blisteringly fast, expensive, and with serious overclocking potential.

From the moment we saw its specs, the GTX 295 was always going to be a quick card. ATI had held the performance crown for way too long and for that reason this card from NVIDIA had to be faster than the already quick HD 4870 X2. The challenge for NVIDIA is that companies are currently sticking to the reference GTX 295 design due to the dual GPU nature of the card being difficult to modify.

So, out of the box the card doesn't really show anything that we haven't already seen in the reference design. In the physical department we have the same cooler with a different sticker. As you would expect, the I/O also has the two Dual-Link DVI ports along with a TV-Out and HDMI port.

The clocks of the card are also reference-based and come in at 576MHz on the core, 2,000MHz DDR on the 1,792MB of GDDR3 memory and 1,242MHz on the shaders. Initial testing has shown that the GTX 295 has some serious overclocking potential and we don't doubt that there will be overclocked models making their way to the market sooner rather than later.

While the bundle is very limited with only a driver CD, manual, S/PDIF loopback cable and DVI to VGA connector present, the performance of the card is blistering fast. It performs exceptionally well under some of the most intensive games on the market today such as Far Cry 2 and it manages to put out playable frames per second at 2,560 x 1,600 with settings at high to very high.

The Gainward GTX 295 is fast; there's not a whole lot more that has to be said about it. While it might be lacking a bit in the bundle department and the price is going to be hard to swallow, if you find yourself wanting the fastest graphics card on the market you're quickly going to find yourself having no real trouble looking past those few small flaws.

Ultimately, before we even saw the card we knew that it was going to carry two things, excellent performance and a huge price tag. Of all the parts in your system that make gaming enjoyable, the graphics card is the most important and this card will leave you with a smile from one end of your face to the other.

Gainward
@ www.gainward.com

✔ Excellent performance.
✖ Expensive; small bundle.



PowerColor HD 4830 512MB

A mid-range card with unique I/O features and good pricing.

One area in which NVIDIA overruns ATI is the number of releases out there, which is one of the reasons ATI's HD 4830 slipped under the radar.

We found its aggressive price tag really makes it a good option for a bang-for-the-buck system.

Based on 55nm technology, this 640 stream-based card packs all the features that we've come to expect from mid-range cards.

There's 512MB of GDDR3 running at a quick 1,800MHz DDR on a 256-bit bus; the core comes in at 575MHz and the cooler that Powercolor has opted for makes the card a dual slot one.

From a power perspective a single 6-pin PCI Express connector is needed to get the card up and running.

When you open the package, there is not much there. Apart from a quick start guide, there's a DVD that has a copy of iClone 2 and the necessary drivers to get the card up and running.

While the smaller bundle helps keep the cost of the card down, it's strange not to even have any convertors included in the package.

However, the limited bundle can be explained once you take a look at the I/O side of things. PowerColor has not only included a DVI and VGA connector, but also a HDMI one.

It makes the card a good choice for people looking for a home theatre PC card with a bit more punch, or a card to accompany a monitor that uses HDMI as its form of connectivity.

Performance is good for the price and makes the card on a whole pretty good value.

While it would have been nice to see something better in the bundling department, the connections you need are already built onto the card anyway.

ATI are far from being down and out and while they might not have the fastest card on the market any more, they continue to have some very aggressively priced models out there. The HD 4830 is one of these and PowerColor's few touches to the card make it stand out.

Australia IT
@ www.australiait.com.au

✔ Excellent value; onboard HDMI; decent performance.
✖ Low availability; non-existent bundle.



ASUS EAH4870 Matrix ROG

Great feature set and quality make up for the high price.

Last year ASUS expanded its graphics card line-up with the new Matrix series of cards. Unlike the TOP family of cards, which generally carried the same cooler whilst offering impressive overclocks, the Matrix cards introduced new coolers and a black PCB. Jump forward and we find more products coming under the Matrix naming scheme, as well as the series becoming part of the Republic of Gamers branding that ASUS used to make their high-end boards stand out.

The HD 4870 Matrix card out of the box is exactly what you would expect. The cooler carries with it two fans, a larger one that sits over the top of the GPU and a smaller one located towards the back of the card. We have a number of heat pipes within the cooler and all have aluminium fins coming off them to help keep temperatures as low as possible.

When it comes to the specifications department the clocks aren't as impressive as the TOP series of cards, but they are still slightly increased from the stock speeds. ASUS has bumped the core up by 20MHz to 770MHz while the 512MB of GDDR5 memory has moved from 3,600MHz QDR to 3,680MHz QDR.

When the card goes onto our test bench it gives us a slight bump in performance when compared to a stock model. While it isn't really enough to warrant the increased price tag, the card carries the superior design of the cooler along with a fairly full bundle that rounds it off as being a fairly nice package.

One piece from the bundle that stands out is the iTracker software that lets you really get down and dirty with the overclocking. Apart from being able to adjust the overall speed, we're also able to adjust voltages, too. And while it may sound scary to some, the whole process is painless and lets us achieve even higher performance.

The HD 4870 Matrix ROG from ASUS is a whole package; everything ties together. While one of the pricier HD 4870 cards around, the quality is excellent and it does manage to stand out from the competition, which is so important in the competitive graphics card market.

ASUS
@ www.asus.com

✔ Excellent performance.
✖ Small bundle.



Palit GTX 260 Sonic 216 SP

Great card if you want to spend money, but not too much.

If there was ever going to be a graphics card to confuse you, the GTX 260 would be that card. Three variations of the card have been released since the launch of the first model in June of 2008. Originally the card was based on a 65nm GPU, which carried with it 192 active stream processors. Come September, we saw a new version of the card sporting 216 stream processors. The recently released latest version is the same 216 stream processor card, but with a GPU die shrink to 55nm.

Both upgrades to the card were great. The 216SP jump gave us more performance and the new 55nm card should give us lower temps while increasing overclocking ability. Palit hasn't wasted any time with its particular model, the Sonic version reviewed here. It carries with it the 55nm GPU and 216SP and also has an increased core clock of 50MHz, bringing it to 625MHz. The 896MB of GDDR3 memory has also moved up from a weird-sounding 1,998MHz DDR to a much-nicer-sounding 2,200MHz DDR.

In true Palit style the bundle is pretty standard, with only the necessities present. These include a driver CD, quick installation guide, S/PDIF loop back cable, component dongle, dual molex to 6-pin PCI Express power connectors and a DVI to VGA and DVI to HDMI connector.

With the card in our test system we quickly see some excellent performance when compared to the original GTX 260 that was released in the middle of last year. The extra stream process with the ramped up clock speeds really gives us a nice boost in performance. And with a bit of shopping around, the card can be had for quite an aggressive price.

Not only does the Sonic version of the GTX 260 216SP pack some serious performance, the dual-fan design also helps keeps temps way down.

This is a great card that offers excellent bang for buck for people who want to spend money but who don't want to go too crazy. If you go on the hunt for one just make sure that the card is labelled 216SP.

Palit
@ www.palit.biz

✔ Excellent value; fantastic performance; cooling.
✖ Many GTX 260 versions are confusing.

exploding tech

No. 33

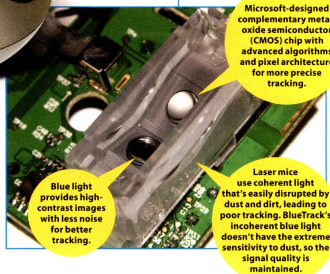
This month we're exploding the Microsoft Explorer BlueTrack Mouse, the next generation of mice technology that works on almost any surface.

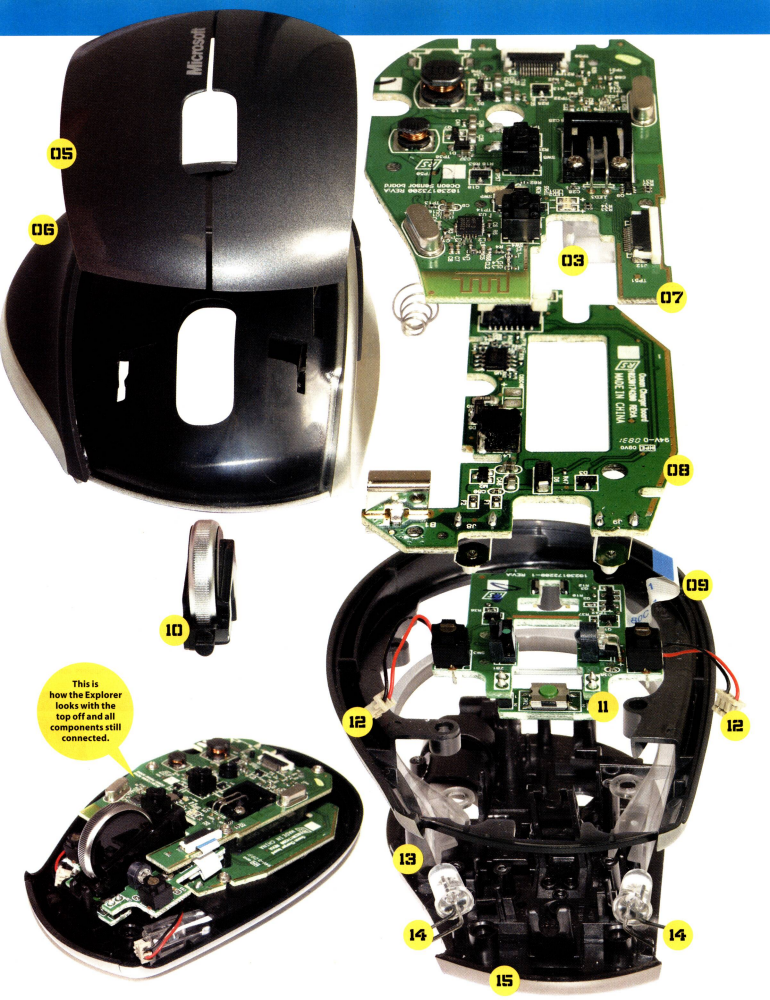
1. Side buttons — all are fully programmable.
2. Charging pad docking points.
3. BlueTrack laser sensor.
4. Snap-in 2.4GHz Wireless transceiver.
5. Silver Pearl-effect mouse cover with integrated 1 and 2 mouse buttons.
6. Ergonomist-approved body for comfortable grip.
7. Main board with laser housing and sensors.
8. Main power board with connectors for rechargeable AA battery.
9. Central board mounts.
10. Control wheel in mounting bracket.
11. Main sensor board incorporating control wheel sensors and mouse button 1 and 2 sensors.
12. Power leads connected to the two lightbulbs (14) in the decorative piping.
13. Transparent plastic frame that lights up when mouse is in use.
14. Two light bulbs for the decorative base lights.
15. Base plate incorporating main board mounts and the control wheel mounts.



Microsoft Explorer Mouse

Microsoft's new tracking technology known as BlueTrack combines the width and power of optical technology with the precision of laser tracking to allow the mouse to be used on a wider range of surfaces. Everything from granite kitchen countertops to the living room carpet is now a suitable workspace. Real chrome accents and blue-light piping around the base give the Explorer a modern look. A battery status indicator alerts users when it is necessary to use the portable charging pad. 2.4GHz wireless technology and a snap-in mini transceiver deliver a reliable wireless connection from up to nine metres away.




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This is how the Explorer looks with the top off and all components still connected.

Best tech

APC's independent reviewers point to the best technologies in the top-selling product categories each month. We only change products when a better one comes along. What you see here is the best technology available on the market right now.



Movers & Shakers

New tech on the move

We've added a new category this month, for Digital Photo Frames. We had to. Retailers tell us they sell them by the truckload and we can't ignore them any longer. Our selection this month shows the Kodak's W1020 photo frame which not only displays photos, but connects wirelessly to services like Flickr, as well as bringing you the news and weather.

LOOK OUT FOR THESE

NEW

Products marked with this stamp are the latest additions to Best Tech.

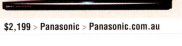
	NOTEWORTHY	BEST VALUE	BEST PERFORMER
GENERAL PC	**Altech NRG Storm**	**Dell Inspiron 530 E5200**	**TI Extreme Power 920**
	Altech keeps updating the Storm. Now powered by Core i7 Extreme Edition 965 chip, plus 12GB of DDR3 triple channel memory and 3 GeForce GTX280 cards. 	We just can't go past Dell for value here — dual-core processor, 3GB of RAM, Vista, now 500GB HDD, Vista and 20in widescreen monitor — all for around $1,000+. 	Brilliant high end system based on 2.76GHz Core i7 920 chip, Gigabyte EX58 Extreme board, 3GB of Corsair RAM and two 1TB hard disks — half the price of similar monster PCs. 
	$7,999 > altech > altech.com.au	**$1,099 > Dell > dell.com.au**	**$3,250 > Trinity Int. > ticocomputers.com.au**
HTPC	**Sony VAIO VGX-TP2G**	**HP Touchsmart IQ500**	**HP Touchsmart IQ800**
	Adventurously designed media centre PC. No screen as it assumes you will connect it to a TV with its HDMI port. Has a 2.1GHz Core 2 Duo and 500GB HDD. 	This is the closest the PC world has to the iMac, with a touchscreen that reminds you of the iPod touch. Great, no-fuss home theatre PC. 	HP has really nailed the concept with the IQ machines. The IQ800 is the closest thing to a merger of the PC and TV. Full HD screen, TV tuner, Blu-ray player. 
	$2,399 > Sony > www.sony.com.au	**HP > $2,499 > hp.com.au**	**HP > $3,799 > hp.com.au**
TINY PC	**Dell Studio Hybrid**	**DreamVision Atom Mini PC**	**ASUS Eee Box B202**
	PCs are clearly tired of being branded boring. But like Apple, Dell expects a premium for these designer pill-shaped low-power PCs. 	One of the first based on Intel's Atom dual-core CPU. Add a 2.5in hard drive and you have a mighty mite PC. 	ASUS has taken its enormously successful Eee PC concept and applied it to a desktop. Atom-powered, 1GB of RAM and 80GB drive. 
	$2,135 > Dell > www.dell.com.au	**$399 > Pioneer > Pioneercomputers.com.au**	**$429 > ASUS > www.asus.com.au**

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
CPU	AMD Phenom II X4 NEW	Intel Core 2 Duo E8600 NEW	Core i7 920
	With a completely unlocked multiplier and sizable frequency headroom, this is the CPU that puts AMD back in the game against Intel. 	Most expensive of Intel's dual core CPUs, but in many single processing benchmarks is superior to the older quad-core Q line, and doesn't need an X58 board. 	The baby of the new Core i7 family blows away its Intel predecessors in anything requiring multi-processing. Needs X58 chipset motherboard. 
	$420 > **AMD** > **www.amd.com**	**$350** > **Intel** > **www.intel.com.au**	**$475** > **Intel** > **Intel.com.au**
MOTHER BOARDS	ASUS P5QL-E Motherboard NEW	Gigabyte GA-EX58-DS4 NEW	ASUS Rampage II Extreme NEW
	Most of the goodies of a good motherboard but at half the cost. Great performance, 400MHz overclocking, with speedy frontside bus and newer PCI 2.0 Express. 	Want to get into Core i7 computing on a budget (relatively speaking)? This is cheapest X58 board for Intel's new CPUs. 	Pricey, but becoming the preferred board of overclocking enthusiasts. Even a casual overclocker will appreciate the features that come with it. 
	$130 > **Asus** > **www.asus.com.au**	**$340** > **Gigabyte** > **www.gigabyte.com.au**	**$700** > **Asus** > **www.asus.com.au**
GRAPHICS CARDS	ATI 4870X2 NEW	HIS ATI 850 512MB NEW	Gainward GeForce 295GTX NEW
	The GTX 295 just shades it in straight performance, but the ATI 4870X2 has a better price-to-performance ratio. Stable, cool, and drivers use GPU power. 	A competitively priced allrounder with enough power for gaming, has HDMI support for 1080p, as well as openGL 2.1 and DirectX 10.1. And is quiet and cool. 	The GTX 295 is the fastest card you can buy. Has best-in-class speeds, works with three-way SLI, and has Physx engine built in. 
	$750 > **AMD** > **www.amd.com.au**	**$260** > **Hightech** > **www.hisdigital.com**	**$800** > **Gainward** > **www.gainward.com**
RAM	Team Extreem Dark PC2 NEW	Corsair TR3X3G1333C9 NEW	OCZ PC3-12800 Gold NEW
	An aggressively-priced low latency DDR2 kit that packs a whopping 4GB across two sticks, more than enough for most gamers. 	Corsair DDR3 memory is reliable and stable, using XMS technology heat spreaders to keep the memory chips cool. Long lifespan backed by Corsair's life time warranty. 	Perfectly suited to the latest Core i7 processors, this DDR3 memory helps expand its overclocking headroom. Will support faster CPUs in future. 
	$130 > **Team Group** > **www.teamgroup.com**	**$165** > **Corsair** > **www.corsair.com**	**$599** > **OCZ** > **www.ocztechnology.com**
PSU	Gigabyte Odin 800W NEW	Antec TP-550 NEW	Thermaltake ToughPower 1500W
	Heavy duty PSU with modular cables and a very low failure rate. This unit is very quiet, but is larger than most ATX units, so the case gets a bit cramped. 	Highly efficient, stable and reliable. It caters from gamers to energy-conscious users. With three +12V rails it evenly distributes power. 	Delivering a monster 1,500 watts. If you're going to run high-end graphics cards in SLI or Tri SLI mode, this is the power unit you want, with 100 amps split across four rails. 
	$230 > **Gigabyte** > **www.gigabyte.com.au**	**$150** > **Antec** > **www. antec.com**	**$519** > **Thermaltake** > **www.thermaltake.com**
COOLING	Thermalright Ultima-90 NEW	Thermolab BARAM NEW	Thermalright Ultra120 NEW
	A less hardcore and more budget friendly Thermalright cooler that manages to shave a few degrees off your CPU. 	Uses copper and aluminium and the positioning of the fins and heat pipes for maxium heat extraction and cold air flow throughout. 	With six 6mm heat pipes and 52 aluminium fins, the Thermalright Ultra120 eXtreme 1366RT is widely regarded as the best Core i7 cooler on the market. 
	$60 > **Thermalright** > **www.thermalright.com**	**$75** > **Thermolab** > **www.thermolab.co.kr**	**$130** > **Thermalright** > **www.thermalright.com**

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
CASES	**Thermaltake Spedo Advanc** NEW	**Antec Nine Hundred Two** NEW	**Cooler Master ATCS 840** NEW
	A big black steel case with many features for the price, lots of bays, slots and ports — and a transparent side panel to show it all off. 	Antec has updated its classic Nine Hundred gamer's case, improving the already over-the-top cooling, and adding better cable managed and paint. 	A huge all-aluminium, full-tower case. With four fans, removable motherboard tray, and support for two power supplies. 
	$299 > Thermaltake > www.thermaltake.com	**$220 > Antec > www.antec.com.au**	**$390 > Cooler Master > coolermaster.com**
MONITORS	**Acer G24** NEW	**BenQ E2200HD** NEW	**Dell UltraSharp 3008WFP 30in**
	A monitor designed specifically for gaming with amazingly fast 2ms response time and 50,000:1 contrast for extra detail in dark areas. 	A 21.5in Full HD Widescreen LCD monitor offering 5ms Response Time, 1920x1080 resolution, Dynamic Contrast Ratio of 10,000:1, speakers, and HDMI input. 	The display that makes geeks go weak at the knees: 30in of bright, sharp 2,650 x 1,600 screen with a full complement of modern connectors. 
	$630 > Acer > www.acer.com.au	**$250 > BenQ > www.benq.com.au**	**$1,899 > Dell > dell.com.au**
INTERNAL HARD DRIVE	**Western Digital 2TB** NEW	**Western Digital Caviar Black 1TB**	**Western Digital VelociRaptor**
	Need more storage? Try the world's first 2TB hard drive. Part of the Green Caviar Green range, this 3.5in drive has four 500GB/platters and a 32MB cache. 	A month ago this was considered a premium drive, but with prices falling why not get the best? One terabyte and 32MB cache. We bought it and love it. 	Fastest mechanical drive with 300GB. Should be the primary drive for OS and apps on a performance system, with a big fat secondary slower drive holding all the data. 
	$469 > Western Digital > westerndigital.com	**$200 > Western Digital > www.wdc.com**	**$280 > Western Digital > www.wdc.com**
SOLID STATE DRIVES	**Super Talent 0X SSD drive** NEW	**OCZ Core Series V2 30Gb** NEW	**Intel X25-M 80 GB** NEW
	The Super Talent drive is not as fast as Intel's, and about as fast as a mechanical Velociraptor — but it's as affordable as 128GBs of SSD gets right now. 	The most affordable route to SSD/HDD computing is with something like this 30GB SSD drive from OCZ. 	The difference an SSD drive makes to system performance is amazing. If you can afford the X25-M, it's the equivalent of a major RAM/CPU upgrade. 
	$550 > Super Talent > www.supertalent.com	**$180 > OCZ > www.ocztechnology.com**	**$700 > Intel > www.intel.com.au**
EXTERNAL HARD DRIVE	**WD My Book World Edition** NEW	**WD My Passport Elite**	**Seagate FreeAgent Xtreme** NEW
	WD is trying to make NAS more user-friendly with this new home 1TB NAS which provides Gigabit Ethernet, Wi-Fi connections and DLNA and UPnP streaming. 	A 500GB portable drive that's fast, looks great and fits in your pocket – and best of all can be picked up for around $200 on the street. 	Doesn't have RAID mirroring but still gives you 1TB of storage and Firewire, eSATA and USB 2.0. Plug it in and it's ready to go. Great price. 
	$350 > Western Digital > www.wdc.com	**$200 > Western Digital > www.wdc.com**	**$199 > Seagate > www.seagate.com**
USB KEYS	**Kingston Data Traveler Blackbox**	**Kingston Data Traveler 150 32GB**	**Kingston Data Traveler 150 64GB**
	Kingston again! They set the standard in USB key drives. This one comes with software that encrypts its contents to FIPS 140-2 Level 2 standard. 	A 32GB USB key that's virtually a portable hard drive — stick hours and hours of video in your pocket. Incredible. Supports Windows & Mac. 	Kingston's 64GB drive takes all that's good with the 32GB drive and doubles it. Stick a bootable USB Linux, apps and masses of data on it like a tiny PC. 
	$140 > Kingston > www.kingston.com	**$140 > Kingston > www.kingston.com**	**$200 > Kingston > www.kingston.com**

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
OPTICAL BURNERS	**Sony DRUV200A** NEW Doesn't burn to Blu-ray but can do virtually every CD/DVD standard out there. Also comes with Nero 8 software.  **$59** > **Sony** > **www.sony.com.au**	**LG Blu-ray/HD-DVD Combo** NEW Plays both Blu-ray and remaining HD-DVD discs, and also comes with a PowerDVD 7. Can be upgraded to support 6 channel audio.  **$170** > **LG** > **www.lg.com.au**	**Sony BWU3200S Blu-ray** NEW Burns to just about every disc format, from Blu-ray (up to 8x) and DVD to CD. With a SATA interface it's easily installed and works with XP or Vista.  **$549** > **Sony** > **www sony com au**
NETBOOK	**ASUS Eee PC S101** NEW One of the first netbooks to transcend utilitarian, the metallic mocha chassis makes it look a million dollars and highlights the evolution of the Eee PC species.  **$999** > **ASUS** > **www.asus.com.au**	**MSI Wind U100** Heaps of netbook for the price — 10in screen, 1.6GHz Intel Atom CPU and 80GB hard drive, as well as a generously sized keyboard for the class.  **$600** > **MSI** > **www.global.msi.com.tw**	**MSI Wind U120H** NEW Same specs as the U100 but delivers on the ideal of the go-anywhere, permanently-connected device by including in-built 3G HSDPA.  **$999** > **MSI** > **www.global.msi.com.tw**
NOTEBOOK ALLROUNDER	**Toshiba L300 Satellite** NEW An alternative to netbooks this solid notebook costs only $900 despite having a 2.16GHz Core 2 Duo processor, 2GB of memory, 140GB HD, and 15.4in screen.  **$949** > **Toshiba** > **www.toshiba.com.au**	**Dell Inspiron 1525** Core 2 Duo performance coupled with 2GB RAM and a 250GB HDD — good with Vista.  **$999** > **Dell** > **www.dell.com.au**	**Zepto Nox 15** NEW A non-nonsense, powerful notebook allrounder. A Core 2 Duo processor, 4GB of RAM, 250GB 7200RPM disk: great performance.  **$3,260** > **Zepto** > **www.au.zepto.com**
DESKTOP REPLACEMENT	**Toshiba Qosmio X300** NEW One of the few true gaming notebooks on the market that does not disappoint thanks to insanely fast graphics processor, the NVIDIA 9800M GTX.  **$3,999** > **Toshiba** > **www.toshiba.com.au**	**Acer Aspire Gemstone Blue 8920G** Incredible 18.4in, 1,920 x 1,080 HD display. There's a Blu-ray drive and 5.1 surround sound. This Core 2 Duo T8300 machine is a 4.1kg head-turning beast.  **$2,699** > **Acer** > **www.acer.com.au**	**HP X18** Top-of-the-line portable media centre. With an 18.4in, 1,920 x 1,080 screen, a Blu-ray player, a DVB-T/Analogue TV-tuner and great speakers.  **$3,899** > **HP** > **www.hp.com.au**
SMARTPHONE	**HTC Dream** NEW The first smartphone released in Australia to run Google's Android OS. With a 3.2in 320 x 480 pixel display excellent keyboard, and rich wireless functionality.  **Plan** > **HTC** > **www.htc.com/au**	**iPhone 3G** Try as we might to find a worthwhile alternative, the iPhone is the best all-rounder smartphone — glorious UI, 3G speed, more apps, and still great pose value.  **Plan** > **Apple** > **www.apple.com.au**	**BlackBerry Bold** The Bold is the most addictive BlackBerry yet, with built-in Wi-Fi and GPS, a stunning screen and DivX/XviD playback. It's still the best for email too.  **Plan** > **RIM** > **www.blackberry.com**
GPS	**Uniden TRAX 430 GPS** Comms company Uniden has released a ripper of a GPS device, impressing with its ease-of-use, exceptional screen and ability to create 3D maps.  **$379** > **Uniden** > **www.uniden.com.au**	**TomTom ONE XL** The most affordable TomTom that delivers the features that matter, with the same display and navigation engine of the more expensive TomToms.  **$399** > **TomTom** > **www.tomtom.com**	**TomTom GO 930** The top-of-the-line TomTom delivers traffic messaging, intelligent live routing, FM transmitter, voice-recognition and text-to-speech.  **$849** > **TomTom** > **www.tomtom.com.au**

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
MEDIA PLAYER	**Sony Walkman NWZ-E436F** A good alternative to the iPod nano, the 4GB Walkman is a slim, great-looking player with a good UI and excellent screen. We think its sound quality beats the nano's.  **$129.95 > Sony > www.sony.com.au**	**Apple iPod nano** A new long narrow design and with an accelerometer that kicks the nano into landscape mode when you hold it sideways. Now in 8GB and 16GB models.  **$199 > Apple > www.apple.com.au**	**Apple iPod Classic 80GB** The number-one selling MP3 player of all time — with the most intuitive menu system and super iTunes software that combines downloads and music management.  **$319 > Apple > www.apple.com.au**
COMPACT CAMERAS	**Panasonic Lumix DMC-G1** NEW A compact camera that looks and acts like a DSLR, with an interchangeable lens facility, but is as easy to use as a point-and-shoot.  **$1,649 > Panasonic > www.panasonic.com.au**	**Nikon Coolpix S550** Good, cheap and easy to use with all the useful features of its more expensive competitors.  **$250 > Nikon > www.nikon.com.au**	**Canon IXUS 80 IS** Probably the best digital compact on the market, with every function you could ever need but still at a great price.  **$379 > Canon > www.canon.com.au**
DSLR CAMERAS	**Canon EOS 50D** Although better than the 450D, the 50D's price stops it being in the Best Value category. Still not as good as the Nikon D90 but still a great camera by any means.  **$2,599 > Canon > www.canon.com.au**	**Canon EOS 450D** The best low-price DSLR you can get. Suited to the amateur photographer, the 450D offers heaps of features in a tiny DSLR frame. Bargain!  **$949 > Canon > www.canon.com.au**	**Nikon D90** This is just sexy! The first DSLR with HD video, the D90 is the best non-professional camera you could get without sending yourself broke.  **$1,699 > Nikon > www.nikon.com.au**
HD CAMCORDER	**Kogan DVC camcorder** NEW While it's not in the Canon Full HD class, it's the only camcorder that delivers Full HD for anywhere near the price. Records in Mov format only.  **$369 > Kogan > www.kogan.com.au**	**Canon HF11** NEW An SD-card based camcorder with few moving parts, long battery life, and low weight. It records in AVCHD format, is easy to use and has excellent optics.  **$1,699 > Canon > www.canon.com.au**	**Sony HDR-FX1000** The ultimate camcorder. Basically a pro camera without some broadcast features, it records full HD on HDV (Mini) tape delivering unparalled quality.  **$5,999 > Sony > www.sony.com.au**
PHOTO FRAMES	**Kodak EASYSHARE W1020** NEW A great 10in display, it comes with Wi-Fi access to connect you to Kodak FrameChannel's news, weather, sports and can receive pictures from Flickr or Kodak's online gallery.  **$285 > Kodak > www.kodak.com**	**Kodak P720 Touch Digital** NEW Kodak's entry-level Photo Frame, with a good quality 7in screen and the excellent Quick Touch Border which makes it really easy to navigate menus.  **$140 > Kodak > www.kodak.com**	**Sony DPF-V900** NEW The frame with the most stylish design and best picture quality and viewing angles that we've seen. Has several display modes and connection interfaces.  **$349 > Sony > www.sony.com.au**
HDTV	**Kogan HD 32 1080P** A 32in 1080p HDTV with HD tuner selling for $899 whose quality is as good as anything in that size. HDTV doesn't get any better than 1080p.  **$749 > Kogan > www.kogan.com.au**	**Sony Bravia W-series** NEW One of the best LCD HDTVs: delivers great blacks, superb colour fidelity and great upscaling.  **$2,699 > Sony > www.sony.com.au**	**Sony XBR series** NEW A plasma killer — an LCD HDTV that cleverly uses LED backlighting in three different colours (RGB), to create the deepest blacks and strongest colours yet on an LCD.  **$6,399 > Sony > www.sony.com.au**

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
TV TUNER	AVerTV DBT-Volar GPS USB Tuner	Kworld DVB-T 395UR NEW	Hauppauge WinTV PVR-350
	In a market filled with USB TV tuner sticks, AVerMedia has differentiated with a GPS device. So if you need to watch TV on a notebook, this device will ensure you don't get lost. 	A basic HD tuner card that allows you to watch HD digital TV on your PC or notebook. It's not flash, but it works well, is portable and convenient. 	With a 125-channel capable receiver, this PCI card pauses and replays shows, is able to schedule recordings and burn them to CD or DVD. Great quality. 
	$115 > **AVerMedia** > **www.avermedia.com**	**$79** > **Kworld** > **www.kworld.com.tw**	**$429** > **Hauppage** > **www.hauppage.com**
DISC PLAYERS	Sony PlayStation 3 80GB	Kogan Blu-ray Player	Sony BDPS350
	Yes, it's a games console, but it also doubles as a Blu-ray player that's as good as any standalone devices on the market. It's the same price as some of the better ones, so do your sums. 	Basic, affordable. Plays back good-quality HD and upscales DVDs. Downside is lack of support for BD-Live (Profile 2.0) which means no internet content or firmware upgrades. But at $249 who's complaining? 	Superb HD playback quality and does great upscaling of DVDs to high definition. Unlike last month's $1,799 Pioneer, available for around $400 on the street. 
	$699 > **Sony** > **www.sony.com.au**	**$249** > **Kogan** > **www.kogan.com.au**	**$400** > **Sony** > **Sony.com.au**
PVR	Dvico TVIX 3330 Jukebox	Wintal PVR2HD	Panasonic DMR-BW500
	Records SD & HD in 1080i with its in-built TV tuner, plays back video, JPEG slide shows and lets you transfer or stream via LAN. 	If all you want is a PVR without an analogue tuner or smarts then this PVR is ideal — it's affordable, it does the job and comes with a big 320GB hard disk . 	Can record two HD programs simultaneously to its 500GB hard disk or directly to Blu-ray media. Ethernet port. 
	$529 > **Lako Vision** > **www.lakopacific.com**	**$499** > **Wintal** > **www.wintal.com.au**	**$2,199** > **Panasonic** > **Panasonic.com.au**
ROUTER	D-Link DGL-4500	TP-Link TL WR941ND Wireless N	Linksys Dual-N WRT610N
	A dual-band gigabit router built for gamers. Helps prioritise game traffic, and now with Green technology, which detects link status and cable length and adjusts power usage accordingly. 	A Draft 2.0 N router with MIMO, using three adjustable antennas for speeds of up to 200Mbit/s. Performance is decent and the documentation is good. 	It does dual-band Wireless N (5GHz and 2.4GHz), is one of the best performers in testing and looks great. Comes with Linksys' superb LELA network setup wizard. 
	$350 > **D-Link** > **www.dlink.com.au**	**$129** > **TP-Link** > **www.anyware.com.au**	**$290** > **Linksys** > **linksys.com.au**
PRINTER HOME	Epson Stylus Photo R290	Canon Selphy ES2	Samsung CLP-300N
	If you want an inkjet that prints phenomenally good photos at 5,670 x 1,440dpi, the R290 should be at the top of your list. 	A dye sublimation printer, the Selphy can print directly from every variation of memory card and even from mobile phones, and you don't need a computer. 	Faster, quieter, and the colour is good for most general printing. Samsung's affordable, network-ready CLP 3000N is perfect. 
	$1,099 > **Epson** > **www.epson.com.au**	**$299** > **Canon** > **www.canon.com.au**	**$349** > **Samsung** > **www.samsung.com.au**
MFC	Lexmark X4875	Brother DCP-165C NEW	Epson Stylus Photo TX800F NEW
	The X4875 is a nice-looking unit that loses nothing to higher-priced competition and looks good in its piano-white finish. 	A moderately priced inkjet all-in-one, that does most things well. It's fast for the price, prints and copies well, and it's not that big given it has an A4 scanner. 	This stylish MFC will look great in a home office — but it also produces good photos and good copying results. Can also be shared across a network. 
	$199 > **Lexmark** > **www.lexmark.com.au**	**$129** > **Brother** > **www.brother.com.au**	**$399** > **Epson** > **www.epson.com.au**

Windows 7 beta: is it worth taking the plunge? *APC* says yes.



WINDOWS 7 BETA as your main OS

Is the Windows 7 beta good enough to replace your existing operating system? **James Bannan** investigates.

Installing beta software is a risky business. The risk is spelt out in the title: the vendor is quite clearly telling you that this software isn't ready for full release, it's almost guaranteed to have bugs and there's no-one you can complain to when things go wrong. If you strike problems with it, it's not like you didn't know.

But what about Windows 7? What's unusual about this OS is that Microsoft has acknowledged it's largely feature-complete, and most beta testers so far report that it runs as smoothly as the OSs it aims to replace, XP and Vista.

At the time this article was written (mid-Feb), the first Windows 7 beta release had been available to the public for about a month and Microsoft was winding up any new download requests, although MSDN and TechNet subscribers will maintain access to the beta builds.

Microsoft initially expected around 2.5 million people to download the beta, and although final numbers are not yet available it seems that this figure was not only reached but surpassed. A release candidate (RC) build is expected around mid-April and this will also be publicly available.

Feedback on Windows 7 has been overwhelmingly positive. Its speed, feature set and ease of use have earned almost universal praise, and it looks set to become the dominant Windows operating system. But if you don't have a spare machine for beta testing or one with enough grunt to run virtualised systems, is it worth taking the plunge and moving your main machine to a pre-release build of Windows 7?

If you're brave enough to take that step, then the answer is definitely yes. In its current form, Windows 7 is very quick and stable, performance is excellent and features like HomeGroup and libraries are fully functional. There have been a couple of documented problems and ongoing bugs, but you can work around them, and they're not crippling in any way.

Additionally, all the reports about Windows 7 having reduced hardware requirements compared to Windows Vista are completely true. If your main machine is some old Pentium 4 system with 1GB of RAM then it's already more than capable of running Windows 7 and you don't need to upgrade to get the Windows 7 experience. You do need a graphics card with a 3D engine in order to run Aero Glass, but even without this you can still run the operating system with no problems.

Running a beta operating system means that, at some point in the near future, a new version (or the final version) will be released and you'll need to upgrade or go back to the old OS. For users currently running Windows 7 beta, Microsoft has confirmed that there is an upgrade path to the RC build and they will be issued with new RC keys which have a longer expiry date. With upgrade installs you always run the risk of some applications not coming across properly, but at least users will have the option to upgrade rather than have to perform another clean install.

UPGRADING THE OLD SYSTEM

If you're still not sure about migrating your system across to Windows 7, an excellent option to consider is dual-booting. Windows 7 co-exists very happily with both XP and Vista, and apart from the benefit of not losing your





current operating system, it's quite easy to remove and go back to a single-OS system if you later decide that Windows 7 is not for you.

The one consideration with dual-booting is having enough disk space. You either need an existing hard drive with enough free space to host two operating systems (and all the applications) or a second hard drive which you can dedicate to the project.

We have some comprehensive step-by-step tutorials on dual-booting Windows 7 on **apcmag.com**, so be sure to check them out.

CLEAN INSTALL

However, if you're happy to take the plunge, give serious thought to performing a clean install of Windows 7 (wipe-and-load). There are a few reasons for this.

Although Windows 7 is more than capable of doing an in-place upgrade of an existing XP or Vista system, there are always applications that don't come across properly. This can be because they're designed for earlier OS versions (like vendor applications that support hardware devices) or because they're simply incompatible.

Additionally, in-place upgrades work by moving all your data to free space on the hard drive, installing over the top and restoring the data. Not only do you need quite a bit of free space to do this; it also takes much longer than a wipe-and-load. And considering that with an upgrade you'll almost definitely be spending more time reinstalling applications and cleaning up, a clean install offers the quickest, smoothest and most stable route to Windows 7.

Whichever method you choose, once you've got Windows 7 up and running the next step is to make sure that you're getting the most out of your old system. Device drivers are the most important first step, but on an older machine it's almost guaranteed that Windows 7 will install drivers for all available hardware; you're unlikely to need to go online and download anything.

Go into Computer Management (right-click Computer > Manage) and see whether any devices have a yellow exclamation mark next to them. If they do then you'll need to source a driver. First stop should be Windows Update (Start > All Programs). Not only will this update the OS software but it will scan your system for any updated device drivers, which will appear in Optional Updates. You'll need to go in and manually select the ones you want.

If there are any drivers which Windows 7 can't source, just go to the vendor web site and grab the equivalent Vista driver, which will work fine on Windows 7. The one exception is graphics drivers: Windows 7 uses a different graphics driver model than Vista so the vendor packages won't work. Either use the drivers available on Windows Update or search for specific Windows 7 beta drivers.

Consider turning off System Restore (right-click Computer > Properties > System Protection) as generating restore points not only causes a lot of hard drive activity that can slow the system down, but the restore points can take up quite a lot of space. Yes you lose data protection but the performance trade-off can be more than worth it. And in any case it's easy to turn back on.

Apart from those few things, you really don't need to do much to get Windows 7 running well on an older machine. It's already very streamlined and optimised and will breathe new life into your current system.





WINDOWS 7 BETA on your netbook

Windows 7 is tailor-made for netbooks. **James Bannan** reports on why you should give it a try.

Windows 7 is shaping up to be an excellent netbook OS because of its lower hardware requirements. Netbooks on the current market are licensed for either Windows XP or a vendor-specific Linux distro. Whilst the Linux option keeps the prices down, most netbook users are opting to run Windows, but then they're restricted to XP. Windows 7 not only runs happily sub-1GB RAM systems but also has the smarts to keep low-power systems quick and productive, and as such makes a fantastic netbook platform.

Before you rush off and wipe your netbook, one great big word of warning first. Because no netbook is licensed for Windows Vista you're not going to find any Windows 7-compatible drivers that are officially supported by the netbook vendor, so if your netbook has any quirky bits of hardware that Windows 7 may not natively support, you'll have to source drivers elsewhere.

This isn't necessarily a problem but it does mean that you should spend some time online researching whether other people have been able to get Windows Vista or Windows 7 running successfully on your particular netbook. Many netbook models have thriving user communities supporting them that tend to be far better than anything put out by the vendor, so it's worth checking them out. Have all the drivers you're likely to need downloaded and ready to go before you start.

One major consideration with netbooks is available drive space. Many netbooks ship with solid-state drives (SSDs) that vary in size. For Windows 7 you need at least an 8GB SSD, and even then you'll have to do a clean install. In-place upgrades or dual-booting won't be options. Additionally, with an 8GB SSD a Windows 7 install will leave very little space for applications or data, so you'll need some sort of secondary storage like a fast USB drive or large storage card.

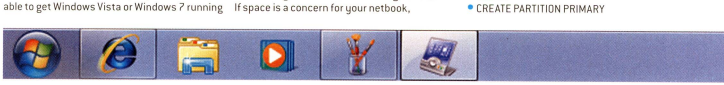
If you want to try and trim down the size of the Windows 7 install, download and install vLite on another Windows-based system (**www.vlite.net**). This tool lets you create a custom Vista/Windows 7 installation by choosing which components to install and which to leave out, then package the whole thing as a bootable DVD image or ISO. If space is a concern for your netbook, definitely take a look at this utility.

The lack of any optical drive makes it difficult to load a new OS onto a netbook. The easiest way around this is to burn the Windows 7 image to DVD and boot the netbook from a USB optical drive. If you have a USB-to-IDE/SATA adaptor or caddy you can use a standard internal optical drive: it works just as well. Another option is to copy the Windows 7 install files to a USB key or drive and boot from that. This is certainly faster than using DVD media but you have to make the USB device bootable. This is best done from another PC.

INSTALL FROM A USB OPTICAL DRIVE

Connect the drive and make sure that the system can see it in Windows Explorer. Open a command prompt (Start > Run > CMD) and type in DISKPART: this is the Windows disk management utility. Then type in the following commands in order:

- LIST DISK (this gives you a list of available physical disks)
- SELECT DISK 1 (assuming the USB device is DISK 1)
- CLEAN
- CREATE PARTITION PRIMARY





- SELECT PARTITION 1
- ACTIVE
- FORMAT FS=FAT32
- ASSIGN
- EXIT

This creates a FAT32 partition on the USB drive and assigns a drive letter. Now make sure the Windows 7 install DVD is in the system's optical drive (or the image has been mounted in a utility like Daemon Tools or Virtual CloneDrive) and type in:

```
xcopy d:\*.* /s/e/f e:\
```

This assumes the optical drive/image is d:\ and the USB drive is e:\. The USB drive is now bootable and ready to go. Attach it to the netbook and power on. When the BIOS screen launches, press the relevant button to launch the boot menu and choose the USB drive. If there is no button, go into the BIOS and either enable the option (usually in boot options) or configure the boot order so that the USB is first. Boot from the drive and install Windows 7.

Once Windows 7 is installed, jump onto Windows Update and download all available updates and drivers, then manually update any drivers which require it. The next step is to tweak the OS so you can maximise the netbook's capabilities.

While Windows 7 will easily run in less than 1GB of RAM, CPU capacity will be a slight bottleneck. With most netbooks running at 1.66Hz you will see the CPU spiking at 100% during activities such as booting and installing or loading applications. These spikes are temporary and the CPU will generally run at under 20% utilisation. If your netbook has an SSD, disable System Restore and Hibernation to claw back some space. If the netbook has a laptop hard drive, consider disabling System Restore to get the performance boost. Another option is to dedicate the card reader to a fast storage card and use it for ReadyBoost.

When running Vista as a netbook platform it's worth disabling Aero Glass in favour of Windows Classic since this claws back at least 60MB RAM as well as some desktop real estate. In Windows 7 the difference between the two themes is only about 30MB and the size of the task bar is the same, so there's little real benefit in disabling Aero. However, try moving the task bar so that it's positioned along the side instead of across the bottom. You get access to more open app windows and you maximise free space along the vertical axis.

Windows 7 ships with IE8, which runs quite well but is not the most streamlined of browsers, particularly with all the available add-ons. Consider using something a bit more lightweight like Google Chrome. It lacks many features but it renders pages quickly and puts the netbook under less stress. For a basic browsing experience it's not a bad choice.

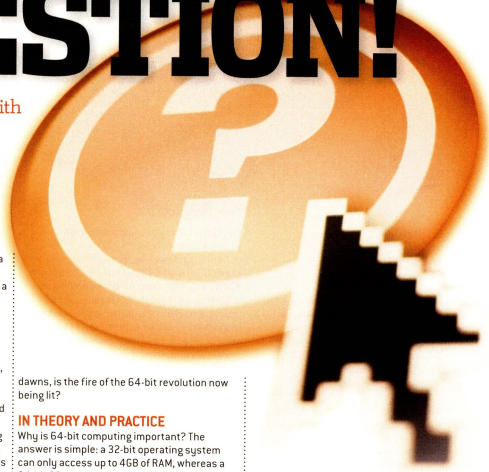
Do some research about the best antivirus for your system. Microsoft has partnered up with some security vendors who are offering Windows 7 AV products, like AVG, but pretty much any AV system will result in a performance hit on your netbook. Some users are opting to avoid AV altogether (in which case use anonymous browsing and don't disable UAC), but ultimately it's a personal choice.

Again, there's not much you need to do to get Windows 7 running well on any netbook. Its clever memory management and inherent responsiveness make for a powerful and flexible netbook OS. With netbook models starting to standardise around 10in screens and up to 2GB RAM on board, expect to see Windows 7 take centre stage as the netbook OS of choice. APC



THE 64-BIT QUESTION!

With the world in love with multicore processors, **John Brandon** urges you to find a place in your heart for 64-bit computing.



There's only one thing worse than a technological breakthrough that never gets going: one that makes a promising start but fails to fulfil its potential. We can live with promised advancements of technologies like speech recognition: a theoretical godsend which would make the lives of RSI suffers easier if only it worked. With 64-bit computing, however, the frustration is more pronounced. We should have faster and frankly better computers by now, but for all its much-vaunted advantages, 64-bit still isn't mainstream.

The situation is made all the more annoying because the pieces of the puzzle began falling into place over seven years ago, when Windows XP 64-bit was released. The hardware's there too: both Intel and AMD have long offered 64-bit processors. Yet driver incompatibilities and a lack of updated software have stalled progress in 64-bit computing.

Thankfully, that's all about to change. Microsoft Server 2008 will be the last version of the OS to be released in both 32- and 64-bit flavours. Major companies such as Autodesk and Adobe have also put their shoulders behind 64-bit, releasing updated versions of their flagship apps. Finally, laptop makers such as Dell and Lenovo now ship a 64-bit OS almost as often as a 32-bit OS. So after a number of false dawns, is the fire of the 64-bit revolution now being lit?

IN THEORY AND PRACTICE

Why is 64-bit computing important? The answer is simple: a 32-bit operating system can only access up to 4GB of RAM, whereas a 64-bit OS can access more RAM than anyone could conceivably fit into their PC case: 17.2 million terabytes (TB). In practical terms, a 64-bit Dell workstation like the Precision T3400 can be configured with 16GB or more of RAM.

The difference is profound. Here's a good visual picture of why the higher memory addressing is important: if the memory size for a 32-bit PC is as big as a standard water pipe to a suburban home, the pipe for a 64-bit computer is as big as the Atlantic Ocean. That's a lot of room for programmers to be innovative in how they handle data, and they wouldn't have to worry about performance or bottleneck issues.

There's another angle to this, however. A 32-bit application can only use 3GB of data for a single process. This means that for many fields (such as the oil and gas industry, or high-end media creation and music production) there is a severe limitation. Companies such as Pixar and LucasArts have used 64-bit Linux computers for the past decade because they need to work with products like Autodesk's Maya, an app for creating 3D models. On a 32-bit PC running Windows, the 3GB limitation per process would mean breaking the models into



separate pieces and continually swapping memory to hard disk.

HIGH-END COMPUTING

The engineering field has also discovered the merits of 64-bit. Autodesk's Revit is an application that enables engineers to create complex data models of buildings. These can have thousands of data points, including wall thickness, structural integrity, wind resistance and so on.

They may also have several thousand more data points for the relationships between those data points: the structural integrity for an outer wall compared to an inner wall with a certain load on the floor, say.

Typically, on a 32-bit PC, the engineers are severely limited. It's not possible to load the entire data model into memory all at once, so they're forced to split the building into sections: an entrance, a hallway, the roof, and so on. As they examine data models for one section, they can't use the other data, because it won't fit into the memory. On a 64-bit platform, the entire model fits into memory, and it's possible to see the relationships between floor structures in a hallway and a corner office, for example. Because a 64-bit app can load many processes into memory all at once, computers become more adept at completing tasks, with the result that better building design is possible.

Another example is game development. In this field, a 32-bit computer is also severely crippled, but not quite for the same reasons. There are thousands of pixels in a texture model, but rendering is usually handled by the GPU. Programming environments (such as those designed for the Unreal Engine used by many first-person shooters) can fit comfortably in the 4GB RAM allocation of a Windows or Linux computer.

However, the developer can't run several applications at once, so the creative process is hampered. On a 64-bit workstation, it's possible to run the necessary toolkits at the same time as a browser, Photoshop, email and the entire game itself.

There's no page-swapping to disk, no slowdowns and few crashes as the memory allocations on a 64-bit platform are more than adequate to handle the workload. More importantly, game testing is easier: testers can run multiple instances of a multiplayer match on the same PC.

Mark Atkinson is the Director of Technology at Crytek, the company responsible for the amazing Crysis Warhead and Far Cry games. With a focus on the PC games market (console versions of its video game are ports from the PC), Crytek is one of the few development companies releasing 64-bit versions of their games. The benefits are clear: the game can be loaded entirely into physical RAM without touching your hard disk for page-swaps, and textures are handled by the GPU. "A high-performance system is a balanced system," says Atkinson. "This means fast disk I/O, plenty of RAM and then multiple powerful cores to do the actual processing. Currently I'd say most heavyweight apps would benefit more from having 8-16GB of DDR3 RAM than from extra processing cores, as the reluctance to break away from 32-bit operating systems has meant that RAM has been stuck around 2-4GB for some considerable time now."

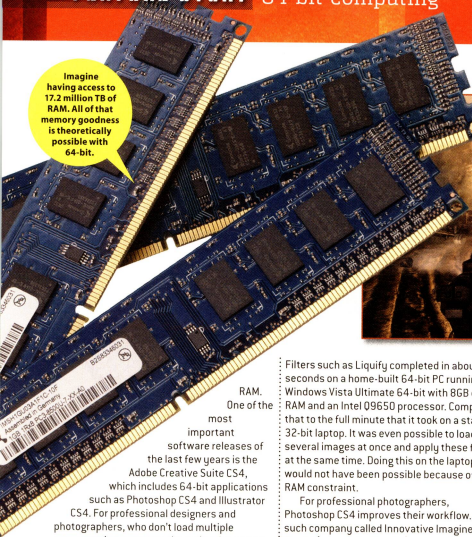
For the typical business user who runs Microsoft Word and Internet Explorer, the advantages of a 64-bit platform are not as clear. To them, the 64-bit platform might seem more like a marketing ploy to convince end-users to upgrade their CPU, get new software and buy Windows Vista in its 64-bit version.

Yet every user stands to benefit from the merits of 64-bit computing as it becomes more widespread.

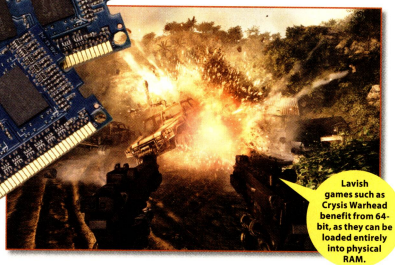
TANGIBLE BENEFITS

The 64-bit platform affords more advantages than just the ability to access more

FEATURE STORY 64-bit computing



Imagine having access to 17.2 million TB of RAM. All of that memory goodness is theoretically possible with 64-bit.



Lavish games such as Crysis Warhead benefit from 64-bit, as they can be loaded entirely into physical RAM.

RAM.

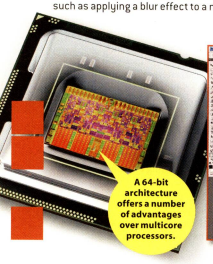
One of the most important software releases of the last few years is the Adobe Creative Suite CS4, which includes 64-bit applications such as Photoshop CS4 and Illustrator CS4. For professional designers and photographers, who don't load multiple processes into memory, the main advantages are speed and agility. Whereas an engineer using Revit might load one building model with thousands of data points, a photographer might open several images, each consisting of thousands of pixels.

In testing, we opened hundreds of images in Photoshop CS4 and found that the program ran about 20 per cent faster for common tasks such as applying a blur effect to a nature shot. Filters such as Liquify completed in about 20 seconds on a home-built 64-bit PC running Windows Vista Ultimate 64-bit with 8GB of RAM and an Intel Q9650 processor. Compare that to the full minute that it took on a standard 32-bit laptop. It was even possible to load several images at once and apply these filters at the same time. Doing this on the laptop would not have been possible because of the RAM constraint.

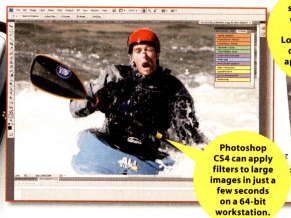
For professional photographers, Photoshop CS4 improves their workflow. One such company called Innovative Imagine Studio (**www.iistudio.com**) creates fine art reproductions of photographs using 64-bit workstations and Photoshop CS4. Files are usually about 320MB in RAW image format, and are typically more than 1GB in size by the time the studio works its magic and turns the photos into works of art, such as watercolours or Giclée prints.

Ellie Kennard, a technician who works with Photoshop at the studio, says that each workstation is equipped with at least 8GB of RAM and that she dedicates about 6GB to Photoshop CS4. The increase in performance that 64-bit gives is staggering. Photoshop takes almost four seconds to open a multi-layered 270MB file on a 32-bit computer running CS3, but just one second each on CS4.

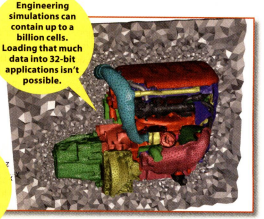
Adobe doesn't talk specifically about speed gains in its products or new features directly tied to the 64-bit platform (other than to say that the CS4 products are 64-bit), but it's clear that the suite benefits from 64-bit development. The improvements include a 64-bit memory address space (more RAM available), native 64-bit integers and pointers (which have a wider register size for programming complex apps), 16 general-purpose registers and 16 SSE (streaming SIMD extensions) registers, relative addressing (position-independent code) and an NX bit (data execution protection for buffer overrun exploits, although this is also present on x86 systems with PAE extension).



A 64-bit architecture offers a number of advantages over multicore processors.



Photoshop CS4 can apply filters to large images in just a few seconds on a 64-bit workstation.



Engineering simulations can contain up to a billion cells. Loading that much data into 32-bit applications isn't possible.

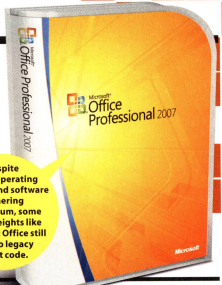
WHERE 64-BIT STILL FALTERS

Despite much progress, bottlenecks and incompatibilities remain.

The 64-bit platform, while ageing nicely, has yet to mature fully. Hardware and software inconsistencies let it down. Take your peripherals: although most hardware produced from 2007 onwards has been accompanied by a 64-bit driver, certain products have not been so lucky.

The real problem is that a 32-bit driver is usually useless when you're running a 64-bit OS. We can blame this on Windows' architecture: drivers sit between the OS and the hardware, a point at which direct emulation is not applicable. As a result, there's no way of emulating the 32-bit processes that they'd be looking for.

Many applications, including high-end software such as Microsoft Office, rely on emulation because they're clinging on to a 32-bit structure. This must be interpreted before it will work under 64-bit operating systems, and this emulation causes a performance hit. Conversely, virtually every 64-bit processor will run 32-bit code (even 32-bit operating systems) with little trouble, meaning that many people avoid 64-bit operating systems altogether.



Despite 64-bit operating systems and software gathering momentum, some heavyweights like Microsoft Office still cling to legacy 32-bit code.

64-BIT vs MULTICORE PROCESSORS

Given the choice between 64-bit applications or a multicore architecture, most developers will now choose the 64-bit platform. One reason for this is that when developing 64-bit applications, coders can use double precision to verify the algorithms used in the software. Software designed for the 64-bit platform also has a longer shelf life because more and more end-users will choose laptops and desktops with a 64-bit operating system in the next few years. This was not true just a few years ago, when the vast majority of applications and operating systems were running in 32-bit.

"Engineers are forever creating larger models," says Barbara Hutchings, who is one of the Directors at simulation and design-analysis software company Ansys. "Larger models are driven by a need for higher fidelity, which translates into a bigger simulation model that requires more RAM. With 32-bit, there's a limit of two million cells, or depth of field. That was a good-sized model about three or four years ago. Today, it's not unusual for there to be 10 million, 200 million or a billion cells. We now access memory in a distributed fashion, using cluster computing with multiple processors, each of which has its own processes running. However, not every bit of the simulation task can be achieved with cluster distribution. Every time the procedure needs to sit at the single process, the 32-bit limit hurts. 64-bit improves that [situation] greatly."

"You can use 64-bit values in a 32-bit environment, but you take a huge performance hit because of the different sets of registers that are needed to run extended 64-bit data ranges," adds Mike Sanor, a technician at Micron. "Some 64-bit operations are not even supported in a 32-bit operating system. For example, a 32-bit operating system can only use 32-bit adds, subtracts, multiplies and divides, so the compiler has to do that for you. You can reduce the amount of calculations the system has to do when you use a 64-bit system. Rather than processing the 64-bit registers sequentially in a 32-bit operating system, the 64-bit OS handles the registers in 64-bit 'chunks'."

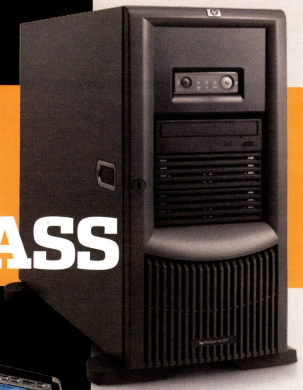
CONCLUSION

The promise of 64-bit computing has taken a long time to mature. The release of Adobe Creative Suite 4 is a major milestone, as it means that 64-bit apps have finally gone mainstream. The release of other 64-bit software, including Maya and Revit, adds to the momentum of the movement.

64-bit applications can access a larger memory envelope, use double precision for programming routines, allow engineers and photographers to apply many gigabytes of RAM to a single application process and let game developers run multiple toolkits on a single workstation. In the future, all drivers and software will be 64-bit. That future is almost here.



SERVER HARDWARE MASTERCLASS



APC's complete guide to server hardware.

With the boom in virtualisation, an understanding of server hardware is critical for any technical professional and, increasingly, for desktop users who are installing home servers.

Yet, unless you work directly with servers, there is little out there that starts at the very beginning and explains the fundamentals of servers.

At *APC* we think servers are sexy. So we are launching the Server Masterclass on our web site for technical professionals. Follow the course by server expert Jarrod Spiga and, by the end of it, you should know servers as well as you know a PC.



THE SERVER MASTERCLASS LOOKS AT THE FOLLOWING:

- **SERVER COMPONENTS AND HOW THEY DIFFER FROM PC COMPONENTS**
- **BLADE SERVERS**
- **STORAGE — DAS, NAS AND SAN**
- **NETWORKING AND CLUSTERING**
- **SCOPING A SERVER — DETERMINING THE RIGHT SERVER**
- **DETERMINING THE RIGHT COMPONENTS FOR THE SERVER**
- **YOUR SERVER'S HOME**
- **MANAGING THE SERVER**
- **AND MUCH MORE!**

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PROJECTS, TIPS AND TRICKS



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WORKSHOP

HOW TO BUILD YOUR OWN LINUX DISTRO

Get the OS you've always wanted and perfect every Linux install by building your own distribution.

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In our new Quick Tips area, we'll answer technical questions and provide quick tips to help you get more from your computer. If you have a question that other readers may be able to solve, email it to *APC* at askapc@acpmagazines.com.au, or post it online on our forums at apcmag.com/forums for a quick reply. We'll publish the best answers and tips each month in the magazine.

Experts solve your computing problems

APC, its readers and our partner publications can be one giant helpdesk. If you have a technical problem, chances are one of us can solve it.

WINDOWS

TRANSFER FILES FROM PC TO MAC

Q I've always been a PC user, but recently I was persuaded to buy a MacBook Air. However, I'm having trouble moving my PC documents onto it. I've found a workaround involving emailing myself my documents, but is there a simpler way that I can transfer my files? I have both machines connected to the same Wi-Fi router.

Jeremy Newcombe

A Using your Mac to read data from your PC is quite easy. The first thing you do is ensure your PC is set up for file sharing by selecting a folder to share and right-clicking to call up its properties. From there, select the Sharing tab and turn on sharing, giving the share a simple name (which you will use on your Mac to access it). Keep the name under 12 characters long for compatibility and check the 'Allow network users to change my files' box if you want your Mac to also be able to transfer documents to your PC.

Now you need to determine your PC's name. To do this in XP, right-click on 'My Computer', click on the Computer Name tab and note the name shown next to 'Full computer name'. In Vista, right-click on 'Computer', scroll down to the 'Computer name…' section and note the name that's shown next to 'Full computer name'.

Now, on your Mac, select 'Go' from the Finder menu and choose 'Connect to Server'. Type in the following, replacing 'computer' with the name of your PC and 'folder' with the name of the folder you shared: (and ignoring the quotation marks, as always): 'smb://computer/folder'.

In the case of the screen image below, we connected a Mac to the Public folder on the computer with the name 'iq500'. Once connected, a new icon will appear on your Mac desktop with the folder name that you supplied. You can now click on this folder to open it and use it for transferring your files between the two computers.

WINDOWS

UNINSTALL INVALID ADD OR REMOVE PROGRAM ENTRIES

Q Sometimes when I try to uninstall a program using the Add or Remove Programs utility in the Control Panel, nothing happens when I click on it. I usually end up having to manually remove the program from my hard disk but am still left with the entry in Add or Remove Programs. Do you know of any way to either restore the Control Panel functionality or remove the defunct program's entry from the Add or Remove Programs list?

Brandon Hinkley

A It's possible to remove the program's entry using AddRemoveCleaner from IntelliAdmin (**www.tinyurl.com/arclean**). When run, it lists all of the entries from Add or Remove Programs (and many hidden ones). Carefully select those that you would like removed and click the 'Remove' button. But be aware that this cannot be undone.

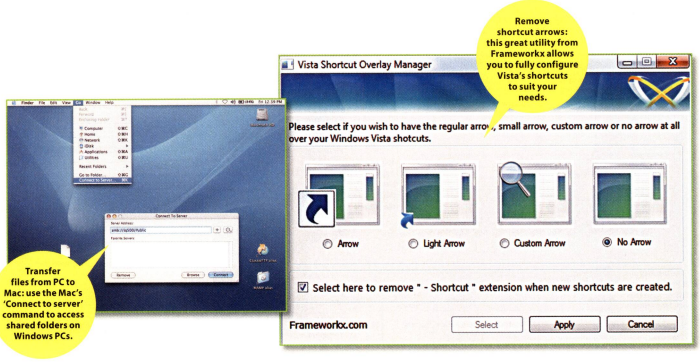
LINUX

EMULATING READYBOOST

Q I think ReadyBoost is one of the best features of Windows Vista. It's a shame that it isn't also available for Linux. Do you know of any way to emulate the feature?

Georgina Atkins

A It's quite easy to give Linux a ReadyBoost swap drive. For example, using Ubuntu, all you need to do is plug a (preferably fast) thumb drive into a USB port. Ubuntu should auto-mount it (usually in '/media/usbdisk'), so you need to use the command 'sudo umount /media/usbdisk'. Next find your thumb drive in your terminal by typing 'sudo df –h'. Assuming that it's '/dev/sda1', you should type 'sudo mkswap /dev/sda1' followed by 'sudo



swapon -p 32767 /dev/sda1'. You will now be using the USB drive as a swap drive. To check everything is working correctly, enter 'cat /proc/swaps'. The result should be something like '/dev/sda1 partition 1646620 33952 -1'.

To turn the ReadyBoost feature off again, just enter 'sudo swapo– /dev/sda1'.

WINDOWS

STOPPING VISTA SHORTCUTS

Q Is there any way I can remove the arrows from shortcuts using Vista?

Dennis Farrington

A There's a very handy utility provided by Frameworkx called Vista Shortcut Manager (**www.frameworkx.com**). This utility allows you to change the arrow to a smaller version, remove it entirely or even create a custom arrow. It comes in 32- and 64-bit versions and also lets you prevent the text '- shortcut' from being added to new shortcuts.

WINDOWS

AMEND WINDOWS FIREWALL PROFILES

In most cases, Vista's firewall can be left alone to manage itself. By default all outbound ports are open and inbound ports are blocked except for when an application requests that a port be opened temporarily. One such application is Windows Mail, which uses port 110 (POP3) for downloading email.

Windows Vista is network-aware. This means that it knows what kind of network it's attached to. There are three types of network: public, private and domain. The most insecure of these is the public network. When Vista is attached to a public network, the firewall blocks all inbound ports and turns off network discovery and file sharing. A Vista computer on a public network should be invisible.

A private network is a home network or a trusted network at the workplace. On a private network, file sharing and network discovery are turned on to enable file sharing to take place and to enable media to be shared with other devices.

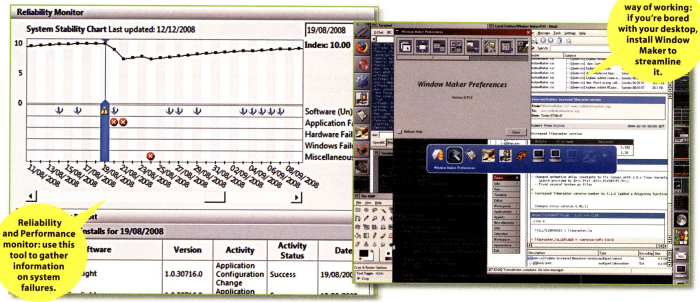
Changes to Windows Firewall settings cannot be made by the user when the network is on a domain. This is because firewall settings are controlled by the domain administrator. If you need to change settings per domain, you must use the Windows Firewall Advanced Settings. Double-click on any rule to see the rule properties. Click on the 'Advanced' tab to choose which network profile the settings should be applied to. Alternatively, connect to the intended network and enable file sharing from the Network and Discovery Centre. Because services such as file sharing use groups of rules, it's faster and more convenient to make this kind of change from within the Sharing Centre.

WINDOWS

NO TO ALL

Q I have a tip that fellow readers might find useful. Recently when copying files I held down the Shift key when clicking on 'No' in a Confirm Folder Replace dialog box and found





that this acted in a similar way to the 'Yes to All' button, except that it had the effect of working like a No to All command.

Sean Marston

A That's right; a 'No to All' button is lacking from this dialog, but pressing down the Shift key when clicking 'No' will achieve the same thing.

HARDWARE

EXPLAIN THE SCROLL LOCK

Q I've always wondered what the point of the Scroll Lock key is. In over 10 years of working with PCs I can't remember ever having used it. Does it do anything? Also, could you tell me what the SysRq, Pause/Break and that funny key with the ` and ¬ do?

Aimee Stephens

A Back in the good old days of DOS, when screen output was limited to 25 rows of 80 characters, you could scroll the screen around by pressing the Scroll Lock key and then pressing the arrow keys. Today it still has its uses. For example, Microsoft Excel spreadsheets use it to allow you to scroll using the arrow keys while keeping the active cell pointer on the currently highlighted cell.

The SysRq key (on the Print Screen key) was originally intended to allow switching between tasks. However, we've been unable to locate any software that currently makes use of it.

The Pause/Break key was used in DOS text mode to pause text scrolling by toggling between halting and re-enabling program execution. It's also used with the Control key to terminate DOS apps.

As for the 'funny key', this is commonly referred to as the Back Tick key and does nothing in DOS or Windows other than display the back quote, but it does have important uses under Unix/Linux.

HARDWARE

NAVIGATE MORE EASILY

At the shell prompt, 'cd' (change directory) is one of the most commonly used commands and includes some shortcuts that you might not be aware of. To switch to your home directory, you needn't enter 'cd /home/username/', but try 'cd' on its own and you'll automatically go there. To return to the directory you were previously using, enter 'cd -'. This is a huge timesaver if you're doing some work that involves frequently switching back and forth between two directories.

WINDOWS

PERFORMANCE MONITOR

To identify applications and services with high system demands, Vista is well equipped for troubleshooting performance problems. Immediate issues such as non-responding applications can be examined in the usual way. Press Ctrl+Alt+Del to see the Task Manager, which contains tabs for Applications, Performance and Processes. Faulty applications and processes can be stopped or assigned different priorities.

More in-depth information is available from the Reliability and Performance monitor. This app shows real-time information about which applications are occupying system resources in four key areas: CPU, disk, network and memory. Start it at boot time to identify non-critical services that can be stopped from running automatically, enabling the computer to boot more quickly.

In the left-hand pane is the Reliability Monitor. It shows a line chart indicating how reliable the host system has been from day one.

Although this can't help to diagnose current problems, it's an interesting gadget to show to the user who is convinced that the computer isn't as fast as it used to be.

HARDWARE

SCRATCHED CDs

Q One of my backup CDs that I use to store photos has become scratched and I can only restore some of its images. Is there a way that I can read the photo files from the disc, even with errors? If so I could probably fix many of them, as I'm proficient in Photoshop.

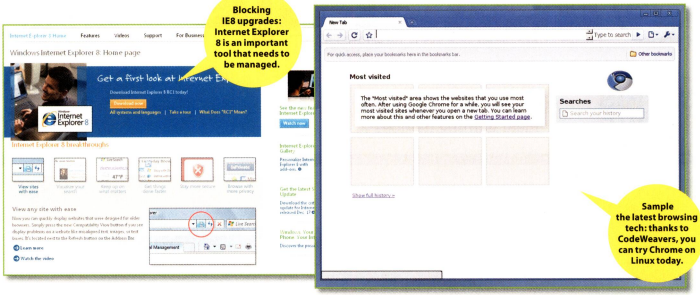
Jennifer Stokes

A Try using the Copy Cat program (**www.vcsoftwares.com**). As you've discovered, when you restore images with Windows, it won't copy files that contain any unreadable data. Copy Cat allows you to skip the bytes that aren't readable from a file and copy all the other ones. The program replaces missing data with blank space and so, as you intend, you may be able to use cloning and other Photoshop techniques to fix these images.

INTERNET

IMPROVE YOUR GOOGLE SEARCH RESULTS

Normal Google search results comprise a mish-mash of documents and file types. You can narrow these down by using the 'filetype' option followed by a colon in the search term. Type the



following to search for only PDF documents that contain the search term 'fat32 specification': 'filetype:pdf fat32 specification'.

Another useful trick to finely hone your search results is the 'allinanchor' keyword. This gives priority to results based on the text used in links to a particular page, instead of the title or contents of the page itself. To try this, type: 'allinanchor:"fix your Registry"'.

Using the above search, you'll see pages that have been linked to using the term 'fix your Registry', which can give you better results than random pages that include every word under the sun to improve their ranking.

LINUX

USE CODEWEAVERS TO TRY CHROME ON YOUR LINUX SYSTEM

Google's slick new Chrome browser is on everyone's lips right now and has even managed to squeeze out of beta status, but there's one problem for Linux users: it hasn't been built for the platform yet. Google is working to resolve this and hopefully we'll see a release in the next few months, but in the meantime, CodeWeavers has come up with a solution.

CrossOver Chromium is a build of Chrome that's supplied with Wine libraries. It's effectively the Windows version of the browser with some wrapper libraries to make it run on a Linux box. You can download it from **www.codeweavers.com/services/ports/chromium**. There are binary packages for Ubuntu, Debian, Red Hat, Mandriva and SUSE, and a generic installer script for other distros.

After installation you'll find the software in '/opt/cxchromium', and you can start the browser by simply entering 'chromium' at the command line. It's a bit rough around the edges right now, but well worth trying given how popular it looks set to become.

LINUX

EASILY MIRROR SITES

Thanks to widespread wireless and 3G mobile phone networks, we can access the internet from nigh-on anywhere now. However, there are still times when you need information from a web site and you don't have a fast or reliable connection (or any form of connection at all).

One way to get round this is to mirror a complete site on your hard drive. This method is particularly good for grabbing documentation such as handbooks that are spread over multiple files or programming language API references. Enter the following at the command line: 'wget -mirror www.site.com/path/'.

Replace 'site.com/path/' with whatever you want to grab. Wget will retrieve not only the root document in that path but also all documents linked to it. It's best to use small sections — the host still has to pay for bandwidth!

INTERNET

BLOCKING IE8 UPGRADES

Internet Explorer 8 is due for release in spring 2009. Here's how to prevent your network from being completely overloaded on day one.

Microsoft has published a tool that will enable IT admins to prevent automatic download of Internet Explorer 8. The utility is deployed using Group Policy and is identical to a tool published for Internet Explorer 7. It comes in two parts: a script which sets a Registry key to prevent download of IE8 and an administrative template (ADM) used to create a Group Policy object. The script can be used to block or unblock IE8 on a local or remote machine and sets this Registry key: 'HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Internet Explorer\Setup\8.0', which has the value name 'DoNotAllowIE80'. Depending on the value of the key name, the local computer will either download or block IE8. This will not prevent users with administrative permissions from downloading Internet Explorer manually.


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WINDOWS VISTA

Win7 HomeGroup

HomeGroup networking is a great new feature in Windows 7. Here's how to get one up and running in no time.

APC EXPERT



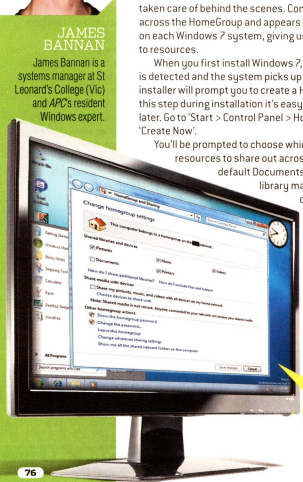
JAMES BANNAN
James Bannan is a systems manager at St Leonard's College (Vic) and *APC*'s resident Windows expert.

The HomeGroup feature in Windows 7 lets you set up a secure peer-to-peer network between all your Windows 7-based machines so that you can easily and seamlessly share documents and media and other resources like printers. Connecting to other Windows-based machines has always been possible, but it takes a bit of work and you need to take into account issues like user security and permissions across systems. On Windows 7, HomeGroup runs as a local service, so all the connectivity and security is taken care of behind the scenes. Content is then shared out across the HomeGroup and appears in the various libraries on each Windows 7 system, giving users seamless access to resources.

When you first install Windows 7, if the network adaptor is detected and the system picks up an IP address then the installer will prompt you to create a HomeGroup: if you skip this step during installation it's easy to create a HomeGroup later. Go to 'Start > Control Panel > HomeGroup' then click 'Create Now'.

You'll be prompted to choose which libraries and resources to share out across the HomeGroup. By default Documents are not shared, as this library may contain personal data, but you can share it if you wish. Windows 7 will generate a secure password for the HomeGroup. This needs to be shared with other users for their systems to become members.

Once the HomeGroup is created you'll have a new entry in Windows Explorer in the left-hand panel. 'HomeGroup' is where you can see all other machines which have joined up.



Windows 7: all the connectivity and security is taken care of behind the scenes.

To join an existing HomeGroup, machines need to be on the same 'Home' network. Location-based network identification in Windows 7 (eg. 'Home', 'Work' and 'Public') are used far more rigorously than they were in Windows Vista, and particularly for HomeGroup networking. All HomeGroup machines must be on a 'Home' network to see each other, and they must be able to communicate on the local IP subnet (ie. they should be able to ping each other).

If you have a complex home network with multiple subnets and firewalls (eg. wireless, DMZ etc.), you may need to open ports for machines to be able to see each other. This also means that although HomeGroup networking works well across IPv6 and Toredo protocols, it won't work across the internet.

Once a system joins a 'Home' network with an active HomeGroup, it will get a popup window informing it that a HomeGroup is available to join. Select the libraries to share and click 'Join now': you'll be prompted to enter the password that was generated earlier. If you didn't write the password down, go to 'Control Panel > HomeGroup' on the original machine and click on 'View or print the homegroup password' or change the password.

Now that the system has joined, both machines can see each others' shared libraries and can access and copy files around. Applications like Media Player can also browse HomeGroup libraries and will play media from them as if they were locally connected. You can also share out the local Music, Pictures and Videos libraries with other network devices like XBox 360s. If you want to share out some custom libraries, right-click on the library in Windows Explorer and select 'Share with', then choose how you want it shared.

Because HomeGroup uses peer-to-peer connectivity, there is no 'master' computer in the group. This means that any computer can leave the HomeGroup without affecting other systems (except that its libraries will no longer be available). The HomeGroup is only deleted when the last machine leaves.



APC EXPERT



ASHTON MILLS

Editor of the Linux Pocketbooks series, and now with CHOICE magazine, Ashton has been a tech journo for over 13 years, including five years with APC.

LINUX WINDOW

Hidden gems

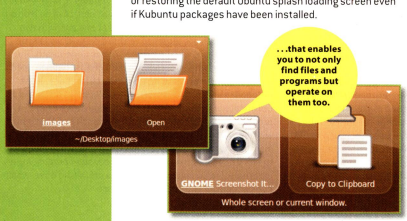
Applications: Ubuntu is loaded with them. Here are some of the best that you might not know about.

At current count the number of packages in Ubuntu's repositories is just shy of 26,000. Now, granted, some of these are libraries and other dependency files for applications, but there's a still a metric penguin colony worth of applications available and — I'd wager — you probably haven't seen most of them.

The Ubuntu Add/Remove dialog does a good job of showcasing the core applications if you take the time to browse the categories, and (previously covered in past columns) Ubuntu Tweak and its Third Party Sources feature can reveal a few more.

However it would take a small series to cover some of the better hidden gems out there, so for now I'll draw attention to a few hidden gems you may not have seen before.

The first of these is *galternatives*. Although not a program you're likely to use often, it's gold when you need it. Once installed it can be found in Applications > System Tools > Alternatives Configurator and will present a list of the default program associations for the system (as distinct from file associations). For example, setting what the system's default text editor is. It comes in handy when you run multiple desktop environments like KDE and Gnome together (as covered last issue) by setting, for example, whether your default login manager should be KDM or GDM or restoring the default Ubuntu splash loading screen even if Kubuntu packages have been installed.



Next is *bum*, the Boot-Up Manager. While Ubuntu provides some control over startup programs and services through the System > Preferences > Sessions and System > Administration > Services dialogs, not every program is listed. Additionally, the Boot-Up Manager gives fine grained control over the runlevels startup and shutdown scripts — again functionality missing from Ubuntu's default tools.

For the command line, there are always some hidden gems, and I'll mention four of my favourites here. The first of these is *mc*, aka. Midnight Commander, which I have actually mentioned in a past column because it's just so darn useful. It's always one of the first programs I install on a new system, right about the time I find myself needing to browse, view and interact with files on the filesystem.

To a lesser degree, *htop*, *procinfo* and *ncftp* aren't as essential but are just as useful. htop is simply a more user-friendly version of *top*, the default process monitoring command. procinfo is a similar informative tool, and used to be installed by default on many distributions, but not so much anymore. And ncftp is, hands-down, the ultimate command-line FTP client. Sometimes it can be easier doing batch transfers from the prompt, and ncftp's ease of use and extensive features make it a pleasure to work with.

Finally, the last gem I want to cover here is one you may not have heard of yet but likely will in future — Gnome Do. In an interesting new take on helping you to work quickly and easily, Gnome Do acts as a sort of searching/browsing/launching tool that enables you to not only find files and programs but operate on them too. Typing in a search term will narrow the focus of what you're looking for, but you can also use the arrow keys to navigate its results and even the filesystem itself. It also provides for plug-ins that can do everything from search Firefox bookmarks or find an address in Google Maps to playing music through Rhythmbox and uploading photos to Flickr. It's kind of hard to explain without using it, so give it a go with 'apt-get install gnome-do' or grab the latest version from the homepage at **http://do.davebsd.com**. All the other programs mentioned here can be installed from Ubuntu's repositories as well, using their titles mentioned here as the package name.

APC EXPERT



PETER CROFT

Now retired, Peter Croft spent his whole working life in broadcast TV engineering. He remembers valves, mono 2in video tape recorders, the Microbee, the original 1981 IBM PC and Windows 1.0. After 40 years as a keen amateur photographer, he also revels in digital photography and the world of computer imaging and printing.

DIGITAL IMAGING

Display photos better

Digital photo frames don't quite cut it if you want to view pictures BIG. **Peter Croft** has found a great solution.

Recently I've been looking for a better way to display my photos than the small, low-res and very expensive LCD picture frames. I thought even a cheap computer LCD monitor driven by a 'tiny' PC would be much better, so I started the hunt for a tiny PC, perhaps small enough to mount on the back of the monitor. It was looking expensive, though.

Then last week I discovered the Western Digital TV HD Media Player. Perfect! Two USB inputs, HDMI output in 1080p high definition (plus composite video and stereo audio on RCAs) powered by a plug pack. It plays most types of video files from any USB hard drive, thumb drive, or SD cards with adapter. This includes my Canon AVCHD hi-def video, most kinds of still images and many types of audio files, especially MP3s.

I'm using it on a Sony Full HD 40in LCD TV with HDMI input and also a Dell W1900 19in widescreen monitor at 1,280 x 768 resolution. In both cases, the pictures are brilliant. Video is so sharp it looks three dimensional. Now I can carry this Dell monitor and the box to friends' places and inflict my stuff on them in all its glory.

The firmware shows signs of being a version 1.00.00 (it's a bit random at times), but it's updateable, so I hope they'll sort out the bugs soon.

Best of all, it's only $199, about the size of a thick paperback book and could possibly be mounted on the back — or the stand of the monitor. I like it. EDITS



APC EXPERT



JOSH MILLER

Josh has been in the computer industry, production and tech support for around 10 years now. He's currently in tech support at Pioneer Computers Australia, based in Sydney, specialising in notebook support and repair, but also works with business PCs, servers and performance and gaming PCs.

HARDWARE

Instant netbook upgrades

It goes like this: buy netbook; decide RAM and storage are not enough; upgrade. This is a quick guide on what to do.

There are generally two upgrades you can do to most notebooks: memory (RAM) and hard disks.

When it comes to RAM, most manufacturers consider RAM a user-upgradeable part, which means basically the RAM will be installed under a small panel somewhere on the bottom of the notebook. It will likely have two Phillips Head screws holding it down, which means you won't need any special tools to upgrade. Netbooks and notebooks use a different kind of RAM to a PC, SO-DIMM RAM, but this memory is still surprisingly generic and as long as the memory speed of any new RAM is the same as the existing memory any brand should work with any notebook.

If you decide to upgrade the memory, open it first to make sure there is a slot available and make a note of the speed of the existing RAM. If you cannot see the existing RAM but have an empty slot you can use a tool such as CPU-ID [**www.cpuid.com**] to find out the speed. When buying the memory, say, 800MHz DDR2 SO-DIMM, a 2GB stick should cost around $90, which makes RAM the easiest, best-value and pleasantly surprisingly effective upgrade.

In terms of hard disks, notebook hard disks have always been significantly smaller than those in PCs, which is why, even if you bought the biggest hard disk available at the time, you have probably been visited by the low disk space message at some point or another. Changing a hard disk in a notebook is generally no harder then changing RAM. Usually you will find a rectangular panel about the size of an iPod on the bottom of the netbook, fastened at one end with two screws. Once this is removed the hard disk will usually be held in metal rails with four more screws underneath. The main problem when upgrading a hard disk is that you need to consider how to deal with your data beforehand. Most notebooks ship with a restore disk or Windows discs and a Certificate of Authenticity, so unless you own a copy of a program designed to clone hard disks, such as Ghost, you will need to back up any data on your existing disk and find installers for any programs you've installed since receiving the notebook. Alternatively you can consider purchasing an external 2.5in case to copy your data off the old drive, which can become an external backup device. EDITS

HARDWARE

Ideal gaming devices

With pinpoint mouse accuracy becoming ever more important, your mouse is key to you becoming a better player.

APC EXPERT



DORIAN BUSSENIUS

Dorian Bussenius has 15 years' experience in PC hardware and assembly. He is an expert in SOHO and gaming system design and performance with Gamedude computers in Brisbane. **www.gamedude.com.au**

First-person shooters are a good example of how a mouse can affect gameplay. If you can't be accurate and fast with your mouse then you won't do well. High-performance mice have a number of advertised features that will usually give you an indication of how well the mouse is going to perform. These include Sensor Type, DPI, Acceleration and some even more in-depth terms.

This is a basic guide to what to look for when buying a mouse for gaming.

SENSOR TYPE

The common types of mouse will use ball, optical or laser sensors. No gamer should use a ball mouse. They are not very accurate and generally require constant cleaning with external material being picked up and deposited inside the mouse. An optical mouse uses an LED light bouncing back to the optical sensor to track the mouse movement. It's far better then a ball mouse but suffers from lower resolutions than a laser mouse. A laser mouse uses a precise laser to track the movements of the mouse. The laser mouse can generally achieve a much higher DPI than a standard optical mouse, making it much more accurate on a wider variety of surfaces.

MOUSE MAT

Getting the right mouse mat is very important. The better the material used the better your mouse will be able to "read" its surface. Choices range from plastics to metal surfaces often with special grooved lines specially formulated to enhance mouse performance. Many will also come equipped with a gel wrist rest or fancy surrounds, but the important feature is the surface the mouse will be moving on.

RECOMMENDATIONS

Use a laser mouse and run the mouse sensitivity at 1:1. Get a mouse that supports the best DPI you can find; if it's adjustable even better. Lower the DPI if the cursor moves too fast, as this will usually happen on lower-res games. Only use the mouse sensitivity setting if there is no other choice, since using this will make your mouse less accurate even though it makes it move more to your liking. Sensitivity makes the mouse cursor "jump" pixels or increases the amount of mouse movement needed for pinpoint accuracy, thus making your game more difficult. [ends]



The type of mouse you use could be the difference between 'high score' and 'game over'.

DPI

Dots per inch gives you an indication of how many movement readings the mouse can take over an inch. A mouse that has a high DPI will read the surface it moves over more times than a lower DPI mouse, thus making more accurate movement possible. Most DPI can range from 400 to 4,000 DPI to date.

SENSITIVITY

You will see mouse sensitivity in your operating system and in games. This is referring to how many pixels one "DOT" on a mouse registers as, for example, 1:1 would mean that for every "DOT" registered on your mouse an equal amount of pixels will be covered in a mouse movement. Slowing down the sensitivity will require your mouse to send more than one "DOT" to equal a pixel movement on screen and making it faster will result in one "DOT" equaling more than one pixels movement on screen.

SYSTEM MAINTENANCE

Hidden processes

It's not just spyware programs that run on your PC without your knowledge.

Everyone knows that spyware, viruses and trojans can put hidden software on your PC that runs in the background and does all sorts of nasty, mysterious things. Some programs, such as MySearchWeb, are not only a pain to remove, but they'll also often reinstall themselves if they haven't been completely removed.

There are also many other systems out there that install an awful lot of files, some that you may not know about. The controversial SecureROM copy protection system used on many PC games hooks itself deep into Windows and, even if uninstalled, leaves elements behind that have been known to continue connecting to the SecureROM servers.

Although you may expect your firewall to block anything that tries to create an outgoing connection without your permission, in the case of something like SecureROM, it already has permission due to you allowing the game to connect to the internet. If you really want to know what's going on with Windows, you need to dig a little deeper and analyse what services are enabled. To start doing this, open a Run box and type 'services.msc' to open the Services Control Panel.

EMERGENCY SERVICES

However, the Services Control Panel may not tell the whole story, so it's wise to call on some extra tools. Process Explorer (**http://tinyurl.com/2huxp3**) not only shows you every running process in Windows, it can also tell you which directories it's using and what DLLs it has open or loaded. If you find a process that you think is suspicious, or if you have a program that's not responding, you can kill the process, although you should use this with caution. If you stop the wrong process, Windows could crash.

One of the best features of Process Explorer is that you can see a summary of what services a process is running by hovering your mouse over it. This is particularly useful for all those mysterious instances of SVCHOST you see running in Task Manager. By using Process Explorer, you can easily tell if that particular instance of SVCHOST is running a legitimate service.

If you want to take your investigation further, there are two other programs that you may want to try. Process Monitor enables you to see every single file action that's occurring, so you can see which files are being opened, written to or saved. That ability can help you identify suspicious behaviour.

The program enables you to create log files, as reading the output in real-time — even with filters set — can be difficult due to the sheer volume of operations occurring. If you suspect that your PC has been infected with a rootkit, then you can also try Rootkit Revealer. This app will highlight file activity that's designed to hide itself from the normal monitoring process. BITEC

APC EXPERT



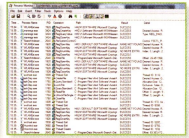
ROBIN NIXON

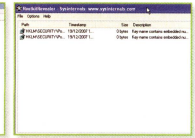
Robin has worked with PCs since the mid '70s. He fondly remembers his first computer: a Tandy TRS-80 with 4KB of RAM.

3 STEPS HOW TO CHECK FOR SUSS ACTIVITY

Delve into the dark depths of your OS to remove deep-rooted malware.







1 VIEW CURRENT PROCESSES

Process Explorer will show you every running process on your PC and enable you to obtain more information about what services and DLLs are being run or loaded. You can kill processes here, but be careful; stopping the wrong one could cause a crash.

2 FURTHER INVESTIGATION

Process Monitor gives a comprehensive overview of exactly what's going on in Windows, showing Registry activity, file activity, thread activity and more. Try creating log files so that's it's easier to view and analyse this enormous volume of data.

3 ANALYSE THE REGISTRY

If you suspect there's hidden software on your PC that's not shown up by other programs, you can use Rootkit Revealer to analyse your Registry and find any discrepancies and security issues that may be detrimental to your PC's health.

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BEST VIRUS DETECTION RATES

PATENTED 'THROTTLE BACK' TECHNOLOGY

Centralised installation & management



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INTERNET BROWSING

Firefox your way

Simple ways to create the browsing experience that you want on your desktop.



APC EXPERT

RICHARD WENTK

Richard Wentk wouldn't be seen dead with a generic copy of Firefox, no matter how pretty it might get.

You can customise the graphics of a typical Firefox skin. You might do this for fun or to customise its look to reflect your corporate branding. We'll explore a couple of simple ways to create good-looking graphics.

Themes are supplied as '.jar' files, which are really renamed .zip files. You'll find several directories inside: Browser, Communicator, Global, Help and Mozapps. Browser is the most important directory for customisation because it includes the most obvious graphics and some of the CSS. It's essential to update the two manifest files — 'contents.rdf' and 'install.rdf' — in our new theme, even though we haven't changed anything else.

These files pass essential information to Firefox about the contents of the theme, including the name, compatible version numbers, author details and so on. There's a template for contents.rdf at **https://developer.mozilla.org/En/Creating_a_Skin_for_Firefox**.

Copy this to a text editor and then do a global search and replace to change 'My_Theme' to a name that you've chosen yourself. Start making some creative changes. Look in the browser directory for the files 'toolbar.png' and 'toolbar-small.png'. These include all of the main toolbar buttons arranged in a grid. The reason why there are so many copies is to show the buttons in different states — normal, pressed, disabled, hover and active.

The easiest way to create replacements is by using layers. Photoshop is ideal for this, but tools like GIMP will work too. On one layer, you create the basic shapes. Higher layers can alter their colours: lighting up a button when the user moves their mouse over it or desaturating it if it's disabled, for example. This means that you only have to draw your icons once, and it's much easier to ensure consistency between buttons. Other effects that can work well include giving the buttons a plastic look with a sweep of translucent white around the top and a darker sweep around the base, or boosting the outlines to make them look set into the interface instead of just floating over it. For more inspiration, the Themes Gallery awaits.

For now, just do something obvious but simple to see it in action: alter the buttons' hue in your art package of choice. For the time being, resist the urge to change any of the icon sizes. These are controlled by the CSS files packaged with each theme, and strange things will happen if you don't update them properly.

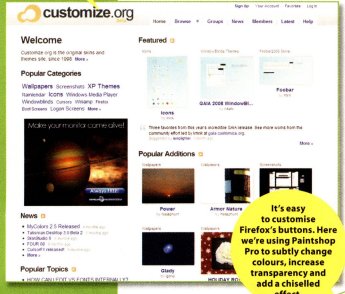
> WE'LL EXPLORE A COUPLE OF SIMPLE WAYS TO CREATE GOOD-LOOKING GRAPHICS

Repack the file back into a .zip file but change the extension to '.jar'. Install it like any other skin and you should see your modified toolbar.

But what about the CSS? There's a lot of it, but a quick way to find the links between the various image files and the CSS placeholders that define where they appear in the browser frame is to do a global search. If you edit the 'browser.css' file, it's easy to see where the toolbar graphics fit in, and it's also easy to change the size and position.

Themes and skins! Get your themes and skins here! And from other locations too, of course.

The default skin is pleasant, but dull. Put your stamp on the web by modifying your Firefox installation so that it looks just how you want it to.



It's easy to customise Firefox's buttons. Here we're using Paintshop Pro to subtly change colours, increase transparency and add a chiselled effect.

PHOTOGRAPHY

Shooting in the raw

Why you should consider shooting with the RAW format if you have a DSLR camera.

APC EXPERT



LEIGH D. STARK

Leigh D. Stark has an obsession for all things with the word "photo" in them and is rarely caught without a hat. He can often be seen teaching photography and has an almost unhealthy obsession with technology.

As more and more people become a little more serious with their cameras and head towards digital SLRs, their choices become a little more diverse when it comes to shooting options.

JPEG is probably the format most people know of and use. It's simple and every computer can read it regardless of what's being done. They can be opened, closed, resized, sent to friends, and printed from with practically no fuss, and everyone — even people you wouldn't consider tech-savvy — knows what they are.

RAW on the other hand is the mystical beast that lurks in the forest. You've heard about it but chances are you have no idea just exactly what it is.

Interestingly, the technology behind RAW is special, while using the format is not. Based around the idea of a high level of data, taking pictures in a RAW format allows one to capture between three and five times the amount of data they were going to capture in the first place. This data includes extra light, colour and contrast values as well as a defining white balance that can be shifted when you get it out of the camera.

Think of it as taking the same picture two or three times, layering them in Photoshop, and then scrubbing back to reveal details, shadows and highlights like you might be forced to do when you get back to the studio.

It is for this reason that many photographers consider JPEG to be much like slide film and RAW to be more like a negative. In this comparison, slide film is practically impossible to negotiate with once you've taken the image. Because the slide film is transparent, details are as you've shot them with little or no ability to pull anything extra from the image. Film negatives are a little easier and often have more hidden beneath their dense layers.

RAW is useful in this way because when you get it back to your computer, you can change information and save images that you might not otherwise have been able to. If you're using Photoshop for your RAW conversions, you'll have options like fill light, shadow, white balance and exposure control which can all be tweaked to give you better results.

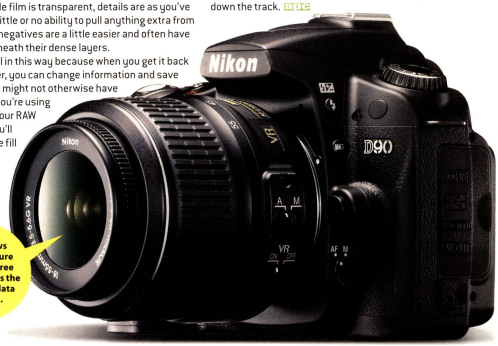
But even though we might always want to shoot in the higher-definition formats, sometimes we just forget to. Maybe you were running out of space or didn't know what that RAW thing was. Well, no worries.

If you're using a version of Photoshop from at least the past five years or so, you'll be able to open up a JPEG as if you were using a RAW. Simply head to the File menu and hit 'Open as…' and when the drop down comes up, select 'Camera Raw'.

> THINK OF JPEG AS SLIDE FILM — AND RAW AS MORE LIKE A NEGATIVE

At this point, Photoshop will load the image up through its Camera Raw plug-in. In this menu, you can change values just like for a RAW image. Unlike the RAW image where more can be brought out, a JPEG is almost completely inflexible. You can't bring out light or details that weren't there, but you can still play with the settings including white balance to get results that would normally take longer if you were fixing them by hand.

It's for this reason that it's always best to shoot in RAW, or as much as possible at least. Even though it tends not to give you the higher image burst rates, it will make processing just that much better, as well as higher quality down the track. EDITOR



PERFORMANCE

RAID primer for your PC

RAID stands for "Redundant Array of Independent Disks" and can be used many ways in a mainly desktop environment.



APC EXPERT

MIKE LE VOI

Mike Le Voi has written for us on sound recordings before but, in fact, his professional area of expertise is setting up RAID for businesses. He is a Software and Performance Technical Specialist.

If you have a desktop fitted with two or more hard disks, you can use RAID to protect your data or to enhance performance. There are many types of RAID. The most common of those in use today are:

- **RAID 0 —** The data is striped across each drive so that read/write performance is improved. However, the failure of any drive generally means the loss of all your data. If you want to use RAID 0, you must have a very good backup regime and be prepared to restore the lot. All disk drives fail — it is simply a matter of time.
- **RAID 1 —** Generally used with 2 drives, the data is read or written to both drives at the same time. If either drive fails, you do not lose data, as one drive is a mirror of the other. There is a performance improvement for read activity as data can be read from both drives. Write performance is no worse than a single drive. For 4 or more disks this is often called RAID 10 — or sometimes RAID 0+1 or RAID 1+0. In some implementations, read activity is always from the "primary" disk, so this protects data but does not provide a performance boost.
- **RAID 5 —** Generally used with 4 or more drives, the data is striped across all drives. Parity information is written such that the failure of any drive allows the data to be reconstructed from the remaining drives. The parity information is spread across all drives. Read performance is improved, as all drives are read. However, there is a write penalty as a "stripe" of data has to be read, parity calculated, and only then can the new "stripe" be written back to the disks.
- **RAID 6 —** Generally used with 4 or more drives, the data is striped across all drives. However, two different parity calculations are performed, thus the RAID group can survive the loss of two drives without data loss. Read performance is not as good as RAID 5 and write performance is much worse due to the extra calculations and data access. However, with a good RAID controller, there's almost no chance of data loss.

HARDWARE RAID

RAID can be implemented via hardware or software. With hardware you have many options. The easiest is a standalone box. A good example of this is the Western Digital My Book Mirror Edition. You can configure this USB attached drive as RAID 0 with 2TB (not recommended) or RAID 1 with 1TB. In a RAID 1 configuration, if a drive fails, you open the top of the case, remove the failed drive and install a new one. A similar unit is available from LaCie and other manufacturers. There are also standalone boxes that can contain from 1 to 4 SATA drives. These boxes normally support easy drive swap and have RAID controllers built in. Alternatively, you can buy a small NAS box with multiple drives and RAID protection. Units are available with 2 to 4 drives. However, they are not cheap and if you want a separate "server" you might prefer to build your own Linux or Windows file server using a large case and multiple SATA drives.

MOTHERBOARD

1 Some motherboards with Intel chipsets have RAID support built in . If you have a chipset that supports this function, this is the next easiest way to protect your data. Using such a controller also allows some sophisticated options, such as the ability to create a RAID 5 and a RAID 0 "virtual disk" across the same disk drives.

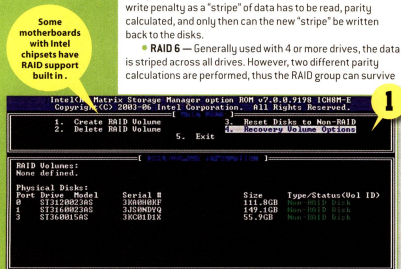
PCI RAID CONTROLLERS

There are many to choose from — and the prices vary enormously. Some cheap PCI cards have 2 or 4 eSATA ports so you do not have to stick all the drives inside the case. Other cards allow you to fit 2 to 8 drives in a large desktop, assuming that you have the power and room to fit them. Some cards have eSATA and also internal SATA ports. You will need a more up-market card if you want to use RAID 6. Most cheap cards only support RAID 0 or 1.

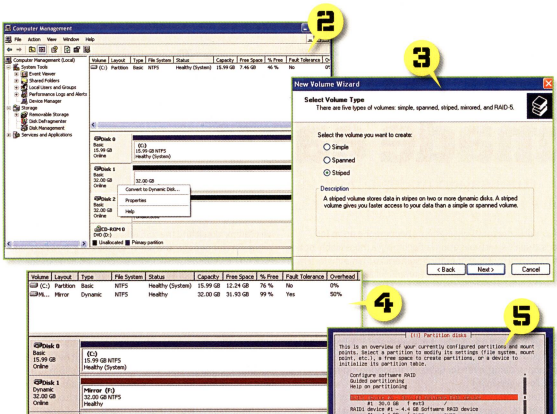
WINDOWS

2 3 Software options are cheap but limited. Most Windows users are running XP or Vista. To use RAID options, you have to convert the disk format from Basic to Dynamic. The default disk type for hard drives in Windows is Basic. You convert the drive from Basic to Dynamic by

Some motherboards with Intel chipsets have RAID support built in .



1



using Disk Management. However, even if you do this, you will only be offered the choice of Spanned or Striped. Spanned disks essentially are a concatenation of two or more drives. Striped is RAID 0. Neither of these options will protect your data when a disk fails. Neither XP nor Vista support RAID 1 or RAID 5.

4 To use RAID 1 or RAID 5, you must use Windows 2003/2008 server. Of course, if you have multiple desktops and/or laptops, this could be a good solution. Essentially, you install the server and then store all your data on the server rather than each desktop. After converting the disk to Dynamic, you can create a RAID set. In this example, we show a Mirror (RAID 1) after it has been created and synchronised.

In general, setting up RAID 1 or RAID 5 under Windows Server is easy. It is not going to be cheap and you are unlikely to want run Windows 2003 Server as your normal desktop. However, it is worth noting that the current public beta for Windows 7 Ultimate has RAID 1 and RAID 5 built in. If you have 3 or more hard disks, this may be an option for you when Windows 7 releases later this year.

SOFTWARE UTILITIES

There are 2 main reasons for using RAID — performance and data protection. In most cases, the home user is far more interested in data protection than performance.

A RAID system will protect data from disk failure — but it does not protect the data from human error — like deleting the folder with your important data. Nor does it protect you if your house gets burgled or burns down!

Good data protection involves redundancy, backup and offsite protection. Now that external USB drives are small, self-powered and up to 500GB in size, you have the ability to use simple utilities to protect your data. There are many utilities to perform backup processing. Some of these will replicate data from one drive to another.

You can even use a command that has been around since the Windows 2000 Resource Kit — ROBOCOPY. If you have a well-defined directory structure, you can use ROBOCOPY to mirror required folders from one drive to another. Copy all your important data to your partner's PC — and vice versa. Copy all the important data to an external drive and leave it at work or with a friend.

Remember, all disk drives will fail. If you are unlucky, you will lose 2 drives in one day. This happened to me a year or so ago when one drive failed and the drive with the backup failed during the restore!

For this reason, keep 3 or more copies of all your important files. Make sure at least one or two copies of this data are offsite on portable hard drives. In an era where all our music, photos and email are on disk, you need to take simple measures to protect them. LITE

OTHER OPTIONS...

WINDOWS HOME SERVER

Windows Home Server (WHS) is not RAID per se but it has the option to keep multiple copies of files on different drives. You define the folders for which replication is required and WHS will keep two copies. In addition, the drives do not all have to be the same size. The other obvious attraction of WHS is the ability to be a backup server for your desktops.

You do not need to purchase a fully configured WHS unit. Some Google searches will quickly find outlets selling the OEM version. You supply the PC and hard drives and then install WHS yourself.

LINUX

5 For Linux, you have the same problem. Using Ubuntu 8.10 as an example, the desktop install gives you no options to install RAID processing. If, however, you install the server version of Ubuntu 8.10, you can choose RAID as part of manual partitioning during the install. In this example, we have formatted 2 drives as RAID 1 and defined a root and swap partition on each. After the installation finishes, you can administer the RAID set with the mdadm command. The following screenshot shows the state of the disks after reboot. For full details of how to perform this setup, refer to the following web page: *http://tinyurl.com/24x25z*.

Note that this is a non-trivial task. You have to do many steps to mirror GRUB and to handle the failure of a disk. This is not for the faint-hearted!

OPEN SOURCE CHALLENGE

Virtualisation made easy

Virtualisation under Ubuntu is easy with the right tools, and there are a few to choose from, including one that comes in the box.



APC EXPERT

ASHTON MILLS

Ashton has been using Linux since Slackware came on floppies, and before that he was one of the three people in the world who used OS/2 (and loved it). Always ready to make the most of his PCs, he is constantly playing with Linux distributions and compiling the latest kernel. This is his idea of fun, and why we get him to write for you

As multi-core multi-gig systems become the norm for desktop PCs, virtualisation is becoming a more viable option for running multiple operating systems on a machine. If not for day-to-day operation, then simply as a way to explore new versions of Windows and Linux: there's no safer method to play with Windows 7, or the next Ubuntu release, than in a completely sandboxed environment.

It's also simply easier — you don't need to partition your machine, muck up your boot manager and risk losing data if Windows decides to clobber your environment (which it has a habit of doing, even for users dual-booting multiple Windows versions).

And finally, of course, when you're finished uninstalling it's simple — simply delete the container file that represents the virtual partition the OS is installed on.

Under Linux there are a few options for virtualisation, each with their pros and cons. The two most popular are KVM and VirtualBox. Actually, KVM is considerably less well known than VirtualBox — largely because there's not a lot that's been written about it — but it's just as capable and, even better, is built right into the kernel you're running now.

VIRTUALBOX

Sun's VirtualBox has matured nicely over the years, providing hardware virtualisation through Intel VT and AMD-V and eventually adding 64-bit guest support (after, it should be noted, KVM). It also sports a very easy interface to set up and manage virtual machines. VirtualBox was originally developed by Innotek, later acquired by Sun, who in 2007 opened it up to the world with an open source edition under the GPLv2.

Today VirtualBox is free to download and use under a Personal Use and Evaluation Licence (PUEL), and the OSE (Open Source Edition), which is identical sans some features Sun reserves as incentives for corporate licensing. Additionally, only the OSE version can be distributed, which is why distributions will often bundle or make available the OSE version but not the binary-only PUEL one.

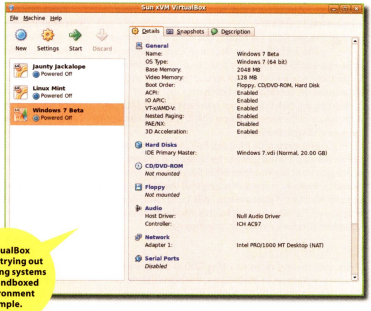
This doesn't mean you can't use it however. In Ubuntu if you click 'Applications > Add/ Remove' and search for 'virtualbox' you'll find the OSE edition. If you surf to the VirtualBox homepage at **www.virtualbox.org**, however, and click on Downloads you'll find pre-compiled binaries for every version of Ubuntu anyway, in both 32-bit and 64-bit flavours. These packages use the PUEL licence and come complete with the missing features (such as USB support) not present in the OSE version. And, often, they are more up to date than the version in the Ubuntu repositories.

VirtualBox is relatively straightforward and has been covered in the past in *APC*, so I won't go into it here. If you need an 'easy to get into' virtualisation, VirtualBox is hard to beat and, as long as you're using a mainstream distribution, you can always get the latest binaries direct from Sun.

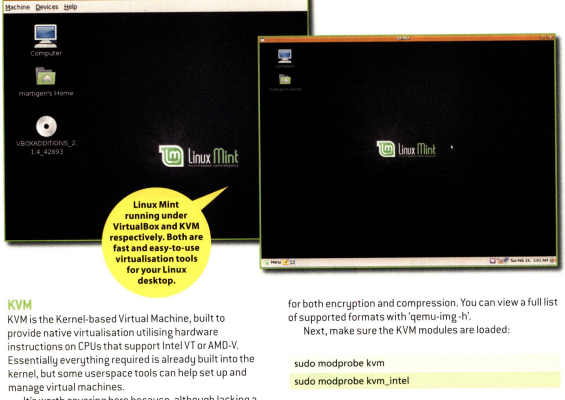
The only caveat to remember is that, like all good virtualisation software, the kernel interface drivers need to be re-built if you change your kernel. VirtualBox makes this very easy to do as well — if you upgrade kernels, or compile your own, you can build the VirtualBox modules like so:

```
sudo /etc/init.d/vboxdrv setup
```

Finally, also remember for best performance to install the Guest Additions, which provides virtualised drivers for the guest operating system.



VirtualBox makes trying out operating systems in a sandboxed environment simple.



KVM

KVM is the Kernel-based Virtual Machine, built to provide native virtualisation utilising hardware instructions on CPUs that support Intel VT or AMD-V. Essentially everything required is already built into the kernel, but some userspace tools can help set up and manage virtual machines.

It's worth covering here because, although lacking a slick interface compared to VirtualBox, KVM is the native virtualisation technology that comes with the Linux kernel and, like Linux itself, is fully open source.

It also has the edge on VirtualBox for performance, though only by a small margin. It also supports SMP in guests (so you can allocate two cores from a quad-core to a guest machine, for example), which VirtualBox currently can't do. So, despite the lack of a GUI it has a number of advantages, and it's still relatively simple to set up from the command line. And, knowing how to run it gives you one more option for creating and running virtual machines.

To start with KVM first, make sure you have the required user-space tools installed:

```
apt-get install kvm qemu
```

QEMU started as a software-based emulator and has been around for a long time — parts of VirtualBox are actually based on it — and recent versions have been modified to take advantage of KVM. It also comes with tools that allow it to read and write virtual container formats from other virtualisation software, including VMWare and Microsoft's Virtual PC for Windows.

If you're making a new virtual machine for the first time, you need to create a virtual disk just as you would with VirtualBox. And, also as with VirtualBox, you can create 'dynamic' disks that grow as needed so you don't need to allocate gigs of space to a machine at once (but make sure you have at least the volume available for an install of an OS!) To make an 8GB image ready for a new machine, use:

```
qemu-img create JauntyJakalope.img -f qcow2 8G
```

The 'qcow2' switch is the format of the file and provides for both encryption and compression. You can view a full list of supported formats with 'qemu-img -h'.

Next, make sure the KVM modules are loaded:

```
sudo modprobe kvm
sudo modprobe kvm_intel
```

If you have an AMD CPU, use 'kvm_amd' instead. Finally, start KVM and point it to your virtual disk and the source .ISO image of the operating system you want to install (or, alternatively, your actual DVD/CD drive):

```
kvm -m 1024 -hda ./JauntyJakalope.img -cdrom ./jaunty-desktop-amd64.iso -boot d
```

The '-m' switch specifies how much memory to give the machine, '-hda' specifies the first hard drive device, '-cdrom' the removable media, and finally '-boot' indicates which medium to load from, in this case the CD-ROM. After an operating system is installed, the '-cdrom' and '-boot' switches can be omitted (or you can point the CD-ROM to /dev/cdrom).

There are other options you can pass as well: '-vnc :1' will start the machine on a VNC session, like a remote desktop, that you access with Ubuntu's Vinagre client (Applications > Internet > Remote Desktop Viewer), ACPI can be disabled with '-no-acpi', '-usb' enables USB device support, you can enable sound with '-soundhw ac97' (pass '-soundhw ?' for a list of alternative sound cards), a range of networking options for the virtualised NIC (network interface card) with '-net' and, if you want to see just how slow virtualisation is without hardware support, pass '-no-kvm'. It's amazing how far we've come!

While KVM is simple to set up, the lack of a GUI would be nice if only to point to common functions — for example, you can switch between full screen and windowed mode with Ctrl+Alt+F, but this isn't obvious from the windowed virtual machine. Like other programs, however, run 'kvm' on its own for a full list of options.

All up if you're a VirtualBox user give KVM a go. VirtualBox is still easier to use if you're new to virtualisation, but if features like SMP support and a slightly faster VM are important, KVM is a viable option.

ABOUT... SPEEDING UP KVM GUESTS

Just as VirtualBox comes with its VirtualBox Additions to improve performance for Linux and Windows guests, KVM also comes with drivers for the same.

For Linux, these are actually already in the kernel: to configure them for a guest while compiling your own kernel, see these sections:

Processor Type and Features > Paravirtualized Guest Support

Device Drivers > Block Devices > Virtio block driver

Device Drivers > Network Device Support > Virtio network driver

Alternatively, a distro will likely already include these as modules. Load them with: 'sudo modprobe virtio virtio_pci virtio_net virtio_blk'. Note that to use the virtualised network driver, you need to tell KVM to use it with '-net nic,model=virtio' when launching a machine.

ALSO... WHAT ABOUT VMWARE?

VMWare was one of the first virtualisation programs available for Linux. Indeed, from its very first version VMWare was a Linux program. Today however there is no free equivalent like VirtualBox and KVM; the VMWare player is free and allows you to use a VMWare machine, but to create your own virtual machines you need VMWare Workstation, which comes with a 30-day trial and requires registration.

Further, VMWare's products for Linux are only available as RPM, which is fine if you use an RPM-based distribution like Fedora, but Ubuntu users need DEB format archives to install packages.

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MEMORY

Inside Windows' memory

Enjoy a faster, more responsive and more reliable system with **Mike Williams'** extensive guide to optimising your PC's memory.

WHAT YOU'LL NEED

A PC – ANY WILL DO
This workshop is suited to any type of recent-model computer.

MICROSOFT WINDOWS
Although ideally aimed at Vista, XP users will still benefit.

You might think that modern PCs have more than enough memory. Even budget systems come with at least 2GB, and you can add 2GB more for very little cost. 4GB of RAM should be enough for everyone, right?

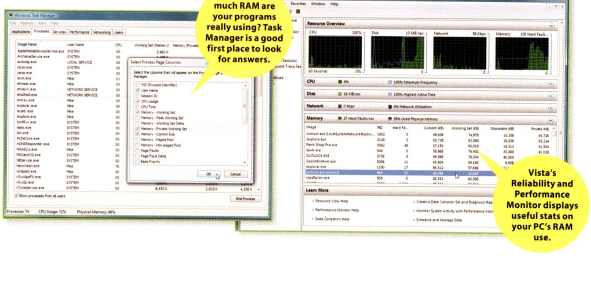
Well, maybe not. Windows Vista needs 2GB to run properly, and large apps can swallow up a gigabyte more with ease. You can very quickly find that your 2GB system is grinding to a halt. Installing another 2GB may not make much difference. Very few 32-bit systems are able to access the full 4GB of memory; some can use less than 3GB. And upgrading to 64-bit Windows doesn't always help.

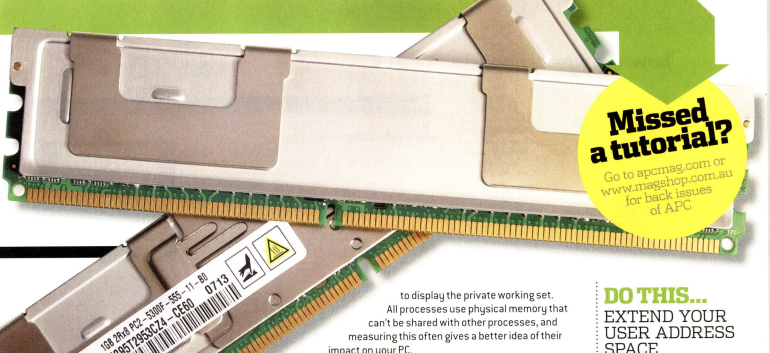
Fortunately, there is one way to deliver guaranteed results. Learn just a little about how Windows and your applications use memory and you can begin to fine-tune your PC, reducing RAM wastage, making more efficient use of system resources and hopefully delivering a real and lasting improvement to your system's performance.

MEMORY BASICS

Most 32-bit Windows systems can address a maximum of 4GB RAM. This isn't the CPU's fault: modern processors have a 36-bit address mode that allows them to access up to 64GB of RAM. Software has to be aware of these 36-bit addresses, though: if not, they'll truncate them to 32-bit and read and write data in the wrong place. That's one reason why Microsoft restricted all the 32-bit client versions of Windows to a maximum 4GB of RAM.

That 4GB address space is split into two. Windows and your drivers get 2GB to themselves, and Windows fools each of your applications into thinking that it has sole access to the other 2GB. You could have five programs running at the same time, each using between 1GB and 2GB of memory, so





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the 4GB figure isn't quite the limit it seems at first. Memory is allocated in units called pages, usually 4KB in size, which are tracked in the PFN (Page Frame Number) database. If you have 2GB of RAM but your programs need to use 3GB, Windows will find pages in physical memory that haven't been accessed recently and write them to a paging file on your hard drive. The physical RAM is then freed up for use by the latest program you're running. This mechanism lets you bypass the 4GB address space limit and run many more applications, but there's a price to pay. It takes much longer to access a hard drive than actual RAM, and so the more use is made of your paging file, the slower your system will get. For more on Windows memory fundamentals, visit the Windows Server Performance Team blog at **http://blogs.technet.com/askperf** and select the 'Memory Management' category.

WORKING SETS

Task Manager is a useful tool for discovering how your PC is using RAM. Press Ctrl+Shift+Esc to call it up and select the Processes tab to see what's running. Then click 'View > Select Columns', check 'Memory — Working Set' and 'Memory — Private Working Set' and click 'OK'.

If you're running Windows XP then you won't see these options. We recommend downloading Process Explorer instead (**www.tinyurl.com/ys2zq2**). Click 'View > Select Columns > Process Memory' and check 'Working Set Size' and 'WS Private Bytes' to see the same information.

You'll now see information on the working set, which is the amount of physical memory owned by each running program. The total working set figure can be misleading, however, as it may contain RAM shared by other processes. If five processes all access the same 2MB DLL, that 2MB will be added to each of their working set values. But Windows is smart enough to only load the DLL once: everyone else then shares the same block of RAM.

To compensate for this, we've also asked Task Manager to display the private working set.

All processes use physical memory that can't be shared with other processes, and measuring this often gives a better idea of their impact on your PC.

Click the Private Working Set column header twice to sort your processes by the amount of physical RAM they're using. Then check the list to ensure that only the processes you really need are running. If some programs are unnecessarily loading at startup, check their preferences for a way to stop it. You can also use msconfig.exe as a last resort.

MEMORY MANAGEMENT

The working set of a process is a very dynamic figure. Run more programs than your memory can hold and the Windows working set manager will start to trim the working sets of your least active processes. Some memory pages may be unused, in which case they can be discarded. Others will be written to the paging file to help free up the RAM you need.

You can use this trimming process to your advantage. One of the simplest methods is minimising a program's windows; this signals to Windows that it should trim the program's working set.

Beware of online memory managers that promise to free up RAM, though. These programs work by allocating a large block of memory to themselves — forcing Windows to send memory pages to the paging file — and then freeing the block immediately. However, Windows automatically trims your application working sets anyway — you gain little by doing it in advance. In fact, you're more likely to lose. You'll have flushed the Windows file cache, applications that have memory paged out will be slower when you switch back to them, and if your memory manager runs in the background then that will be consuming RAM itself.

We would recommend ignoring RAM optimisers, then; but if you do want to experiment with one, try CleanMem (**www.pcwintech.com/node/145**). This uses a Windows function to remove little-used or discarded pages from all your working sets, and it does that job reasonably well. It's free and less intrusive than most optimisers, so if you're determined to try a memory manager, CleanMem is a good choice.

WINDOWS OPTIMISATIONS

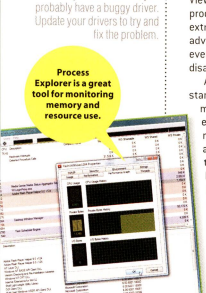
There are several other useful ways that you can cut the amount of memory your PC is currently using. Disabling unnecessary Windows features can be productive, particularly on Windows Vista.

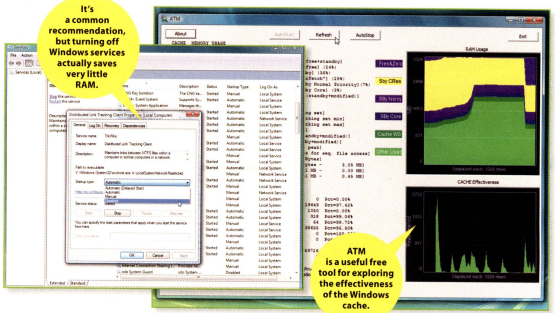
DO THIS...
EXTEND YOUR USER ADDRESS SPACE

Install 4GB on a 32-bit Windows PC and it'll assign 2GB for Windows and keep the other 2GB for apps. Change your boot settings, though, and you can assign up to 3GB for apps, a welcome relief if you're running heavy-duty software. But there's a catch. Halving Windows address space to 1GB means drastic cuts in Windows resources. Drivers may run out of memory and your PC can become unstable. What's more, the benefits are slim. You'll be able to run more apps, but most will still use no more than 2GB of RAM. Still interested? If you're running Vista, click Start, type 'cmd', right-click 'cmd.exe' and select 'Run As Administrator'. Type 'bcdedit /set IncreaseUserVA 3072' at the prompt, press Enter and restart your PC. If you have problems then repeat the previous step using a value such as 2,500 instead (or 2,048 to return to normal). For XP Pro, right-click My Computer, navigate to 'Properties > Advanced > Startup and Recovery Settings > Edit' and add a /3GB switch to the end of the line that specifies your OS (see *www.tinyurl.com/2owme7* for an example). Take care. A mistake in your boot settings can stop your PC starting at all. Don't try this unless you're confident that you know how to recover from just about any situation.

DO THIS... DIAGNOSE MEMORY LEAKS

Some drivers and apps handle memory poorly, frequently allocating new blocks of RAM without releasing everything that they've obtained earlier. This means that they use more and more memory over time. Eventually, your PC will slow down and crash. If you suspect that this is happening to you, launch Task Manager, select the Processes tab, then navigate to 'View > Select Columns' and check the 'Handles', 'USER Objects' and 'GDI Objects' boxes. Monitor Task Manager occasionally and look for programs where memory, handle or object use is constantly increasing. Check the Task Manager's Performance tab, too, and watch the Paged and Nonpaged memory figures. If these increase forever until the systems crashes, you probably have a buggy driver. Update your drivers to try and fix the problem.





SWITCHING TO 64-BIT WINDOWS MAY NOT DELIVER ALL THE BENEFITS YOU EXPECT

Don't need the Aero interface? If you turn it off, you will save 40MB or more. To do so, right-click the desktop, select 'Personalise > Theme' and choose 'Windows Classic'. And if you've installed an antivirus tool, turn off Windows Defender to save yourself another 20MB. Do this by navigating to 'Tools > Options', clearing 'Use Windows Defender' and clicking 'Save'.

Some people think that running Explorer windows in separate processes will improve stability. To try this for yourself, launch Explorer, click 'Tools > Folder Options > View' and check 'Launch folder windows in a separate process'. However, this can consume as much as 10MB extra for every Explorer window that you have open. Our advice would be to troubleshoot your stability problems — even reinstall Windows, if it comes to that — and then disable this separate process option.

As these examples demonstrate, enabling non-standard Windows settings can massively impact your memory use, and even the tiniest tweak can have a big effect. For example, right-clicking the Windows Vista network icon in your system tray and selecting 'Turn on activity animation' will make it flash to indicate network traffic. It's a nice touch, but in order to flash it has to load software support that consumes anything from 1MB to 5MB of RAM. If you want to save your RAM for more important things and can do without this, then right-click the icon to turn the animation off again.

Think about any extensions or add-ons that you've installed, too. We launched Internet Explorer on a test system and found that it had a private working set of around 14MB, rising to 26MB if we opened five tabs. But disable its very standard add-ons (RealPlayer, McAfee SiteAdvisor and so on) and RAM requirements dropped to 8MB for one tab and 15MB for five. Other add-ons are bound to be more resource-hungry, and disabling them could easily give a significant memory saving. To regain your system resources, take a look at the extensions you've installed in IE, Firefox, Office and other applications, and get rid of any you no longer use.

For more information on exactly what's using your RAM, launch Process Explorer, click 'View > Lower Pane View > Show DLLs', then find and click 'Explorer.exe' in the main window. You'll find that it has loaded all kinds of DLLs for many of your applications, which means they're consuming RAM even though they're not running. On our test system, this included support files for Stuffit, SmartFTP, Nero Burning ROM, iTunes, the Adobe PDF reader, 7-Zip and more. If you don't need a program, remove it: you'll reduce Explorer's memory footprint, and you may make it more stable, too.

WINDOWS SERVICES

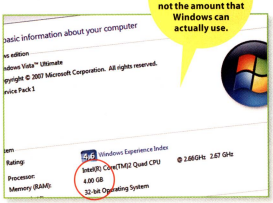
It's often claimed that turning off unnecessary Windows services will free up more RAM, but what sort of results can you really expect?

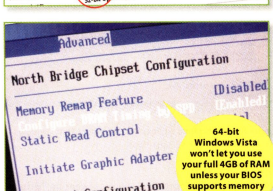
Let's take a look at an example. The Portable Device Enumerator service was enabled on our Windows Vista test system. We didn't need this, so we turned it off and made a 200KB saving.

The Distributed Link Tracking Client provides a way to track NTFS files across a network. This is great if you use it, but most people don't, so we turned it off and saved... 8KB. Yes, you read that right: KB.

The Offline Services was surplus to requirements, so we ditched that and recovered 68KB. Then we got rid of the Wireless LAN configuration service, saving 208KB. Finally, we killed the Tablet PC Input Service to return a minimal 32KB.

Even disabling six services only guaranteed an extra 516KB of RAM, and that comes at a cost. Killing standard





services may break applications you install later, and it could be some time before you realise that you need to turn a service back on to get things working again.

In our view, tinkering with services just doesn't deliver enough RAM benefits to compensate for the potential dangers. Still, it does have other advantages, from shaving a second or two off boot time to improving your security through running less exploitable code, so you may want to pursue this anyway. If so, visit Black Viper (**www.blackviper.com**) for advice on what you can safely remove.

MEMORY MAPPING

If you've equipped your PC with 4GB of RAM then you probably also know that Windows can't use all of it. This isn't Microsoft's fault, though: it's a hardware issue. If you have a 512MB video card, say, then its video memory must be mapped into your 4GB address space in order for your software to be able to access it — but this will automatically make 512MB of your system's memory unavailable. RAM will also be reserved by your BIOS for other memory-mapped devices, and if you've got a lot of them, you might find that less than 3GB of the original 4GB is actually available.

Checking your own system is simple. Run the System Information program (msinfo32.exe) and browse the System Summary. The Total Physical Memory entry will tell you exactly how much RAM Windows can see. Then launch the Device Manager (devmgmt.msc), click 'View > Resources by Type' and expand the Memory section to see exactly which items of hardware are claiming most of your RAM.

You then may be able to recover some memory by removing devices that you no longer need. Use your BIOS setup program to disable integrated devices that you're not using (turn the onboard graphics and sound off if you've added video and soundcards, for instance). And if you've inherited a games machine with a powerful graphics card but don't make good use of it yourself, then it might be worth considering downgrading. The results aren't guaranteed, but if you currently have a 512MB graphics card or greater but never play games or do anything graphically intensive, then switching to a 256MB model and recovering the system RAM is definitely worth a try.

It's also important to consider this point when you buy your next PC, assuming that it's going to have 32-bit Windows. Opting for a 1GB graphics card might impress people, but are you going to use it enough to make it worth limiting your PC to a maximum 3GB of RAM? Make sure you think carefully before you buy.

PAGING PERFORMANCE

Making more RAM available to your applications is a good thing, but Windows will still send data to your paging file occasionally. It's a slow process, and anything that you can do to improve paging performance will make a real difference to your system's speed.

It's wise to place the paging file on your fastest hard drive, for instance, to speed the process up as much as possible. Or, if you have two drives that are roughly equal in speed, just moving the paging file away from your system drive can be handy, because Windows can address the paging file even if your system drive is busy.

Changing your paging file location only takes a moment once you've discovered the right dialog. From the Start button, right-click 'Computer' and navigate through 'Properties > Advanced System Settings > Advanced > Performance Settings > Advanced > Change' in Windows Vista. Alternatively, for Windows XP, right-click 'My Computer' and select 'Properties > Advanced > Performance Settings > Advanced > Change'.

MEMORY LIMITS

HOW MUCH CAN YOU REALLY USE?

VERSION	LIMIT IN 32-BIT WINDOWS	LIMIT IN 64-BIT WINDOWS
Windows 2000 Std/Professional	4GB	n/a
Windows 2000 Server	4GB	n/a
Windows 2000 Advanced Server	8GB	n/a
Windows 2000 Datacenter Server	32GB	n/a
Windows XP Starter Edition	512MB	n/a
Window XP	4GB	128GB
Windows Server 2003 Standard Edition	4GB	32GB
Windows Server 2003 Enterprise Edition	32GB	64GB
Windows Vista Starter	1GB	n/a
Windows Vista Home Basic	4GB	8GB
Windows Vista Home Premium	4GB	16GB
Windows Vista Business/Enterprise/ Ultimate	4GB	128GB
Windows Server 2008 Standard	4GB	32GB
Windows Server 2008 Enterprise	4GB	2TB

MORE ABOUT...

DUBIOUS MEMORY TIPS

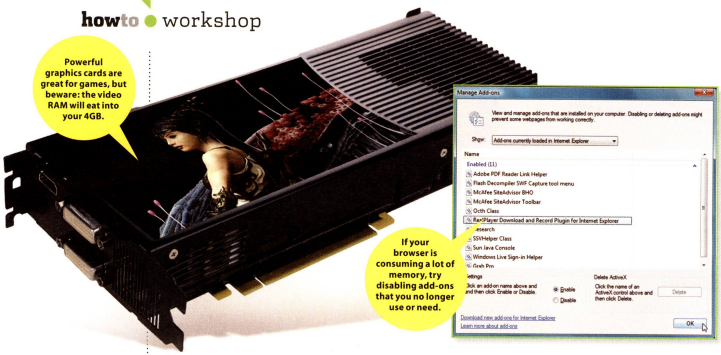
The web is full of memory optimisation guides, and if you've read a few then you'll recognise settings like AlwaysUnloadDLL, IoPageLockLimit and ConservativeSwapfileUsage. You may be surprised to hear that these tweaks will have no effect at all on any version of Windows after 2000.

There's a SecondLevelDataCache setting that's supposed to make better use of your CPU's L2 cache memory. But this is another old tweak that doesn't relate to current CPUs.

Another tip recommends setting DisablePagingExecutive to 1 so that Windows won't page the kernel or drivers to your hard drive. But Windows will do this anyway; disabling it just increases the chances of a crash under heavy load.

Caching is a another favourite topic. Deleting the Prefetch folder or setting the Registry value EnablePrefetcher to 5 won't improve performance. And no, you can't enable SuperFetch caching in Windows XP with a Registry setting.

There are plenty of other dubious tips out there, so be cautious about what you believe. Make changes one at a time, and run reliable speed tests both before and after any tweak to find out what really works.



Once you're there, choose your current drive, select 'No Paging File' and click 'Set'. Click the drive you want to use instead, choose 'System Managed Size' and click 'Set' again. Reboot to finish the job.

Some people also recommend that you fix the size of the paging file, which limits the work involved in resizing it and also stops the file becoming fragmented. This is a risky strategy, though, as it imposes an absolute limit on the amount of virtual memory your PC can use. But if you want to give it a try, then first calculate the maximum page file size that you'll need (forget the 'x times memory size' estimates — they're meaningless).

The best way to do it is as follows. Run your most heavyweight apps for a day or two, checking System Information occasionally (msinfo32. exe). When you do this, note down the Page File Space value (this is the paging file's current size). Take the largest value you've recorded after a few days and add 1GB to it for a safety margin. Then return to the paging file dialog and choose your current paging file drive. Choose the Custom Size option, enter your figure in both the Initial and Maximum size boxes, click 'Set' and reboot.

If you don't use a fixed-size paging file, try defragmenting it occasionally. Use PageDefrag (**www.tinyurl.com/3cb6xt**) in Windows XP or earlier, or follow the Daily Geeks advice (**www.tinyurl.com/6n63nm**) if you're using Windows Vista.

The third option is to disable paging altogether. This is the riskiest option of all, because if an application does require more RAM than you currently have available then your PC will probably crash. And it has other unexpected effects, too. Windows uses the page file to save crash dump files, so if you've turned it off then you'll have much less chance of diagnosing blue-screen errors.

Still, if you're running Windows on a system with 4GB of memory that you're sure you'll never need — a laptop only used for email and browsing the web, say — then turning off paging could make sense. And reducing hard drive accesses will prolong battery life, too. Click your way back to the paging dialog, select your paging file drive, choose the 'No Paging File' option, click 'Set' and reboot your computer to make this happen. Just be sure to save your work frequently for a while until you're sure that Windows is stable with the new settings.

TIP...

Task Manager gives a basic view of your PC's memory use, but if you need more detail then launch perfmon (the Performance Monitor) instead. It provides access to many more statistics, and it can display them in pretty graphs, too.

TIP...

Wondering what the Windows file cache system is doing for you? ATM (*http://tmurgent.com/tools.aspx*) tells you everything you could possibly want to know about your cache setup. You must be familiar with RAM jargon to get the most from the program.

64-BIT WINDOWS

If you're tired of this seemingly endless tweaking then you might be tempted to move to 64-bit Windows Vista. But wait: it may not deliver all the benefits that you expect it to.

Upgrading to 64-bit Windows Vista does get rid of the 4GB limit, raising this to 8GB for Windows Vista Home Premium. And the Windows kernel is no longer restricted to 2GB, meaning that it is able to use as much memory as it needs. But individual applications will still only be able to access a maximum of 2GB of RAM unless they're specifically written to be aware of larger address spaces.

64-bit Windows Vista won't necessarily allow access to all your memory if you've got 4GB installed, either. For this to work, your motherboard chipset must support at least 8GB of address space and your BIOS must support memory remapping so that video and other hardware-allocated memory can be moved above the 4GB address point. And of course the memory remapping feature must be enabled in your BIOS setup program. To find out more about how to access all of your system's memory, take a look at **http://support.microsoft.com/kb/929605/en-us**.

Most of all, you should remember that even 64-bit Windows doesn't do away with hardware-allocated RAM issues entirely. If you've got 8GB of RAM installed on an 8GB system but you also have two 1GB video cards, for example, then you'll only have access to 6GB of system RAM in total (or possibly even less).

Still, if you can live with these issues — not forgetting the various software and driver compatibility problems that come with this upgrade — then in RAM terms at least, 64-bit Windows is a real step forward. It will improve your PC's performance and get rid of many of the 32-bit boundaries, which in turn help to make Windows much more stable: simply removing the 2GB kernel space means an end to running out of Windows resources, for instance. And because 64-bit architecture allows a maximum address space of 16 exabytes (that's more than 17 billion gigabytes), it should be able to provide all the computing power that you need for many years to come. EOTE

DIGITAL IMAGING

Make convincing composite photos

Who says the camera never lies? Use GIMP and our guide to create composite images, says **Christian Darkin**.

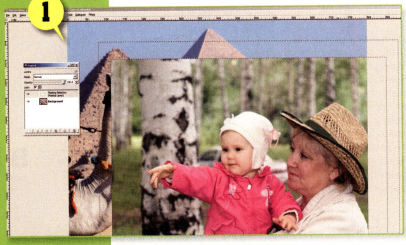
WHAT YOU'LL NEED

GIMP

A free photo-editing package. The principles talked about in this tutorial also apply to Photoshop and Photoshop Elements, so if you own one of these packages, give it a go.

The techniques used in advertising and professional image-making to produce startling and impossible photos can be harnessed by anyone with a PC and a camera using a few simple techniques. By combining elements from one photograph with elements from another, you can create any image. The only limitation is your imagination.

In this tutorial, we're going to produce three composite images using GIMP (**www.gimp.org**), a free image-manipulation package. Firstly, we'll do a simple project — a fake holiday snap made by combining two photos. Then we'll move onto something a bit more challenging — a UFO sighting complete with image grain, motion blur and other effects. Finally we'll use some royalty-free images to create a complex composite of a completely fictional scene.



A BASIC COMPOSITE: FAKE HOLIDAY SNAPS

1 Assemble the photos

The key to a good composite is often taking the time to select good original images. Try to make sure that your background shot and foreground image have similar lighting and perspective.

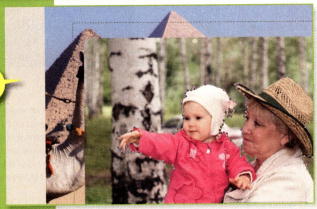
When you've selected the two images that you're going to use, load the background image into GIMP, then place the foreground image in a layer above it and resize it if necessary.

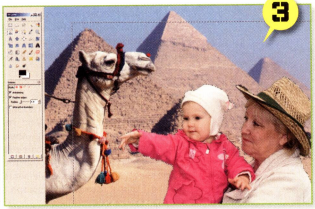
2 Mask the image

Cut around your foreground object (in our case, the two figures) using whichever GIMP selection tool you prefer. In our shot, the differentiation between background and foreground objects is quite strong, so we've used the Intelligent Scissors. This tool enables you to click your way roughly around an object without worrying too much about it; GIMP will fine-tune your initial selection and you can then refine it further in the next step.

3 Refine the mask

Once you've created a mask with the Intelligent Scissors, you can refine it by clicking and dragging to move any of the points. Next, make it into a selection by clicking inside the masked area. If it's still not quite right, try switching to Quick Mask mode (hit Shift+Q to get there quickly). This mode allows you to use paint tools to refine the edges of your selection. It's also a good idea to add a little feathering to soften the edge of the mask (the Feather tool is found on the Select menu). This will make the edge of the cut-out less distinct.





DO THIS... WHEN CUTTING OUT OBJECTS

If it is particularly difficult to cut out your objects, try using an eraser. Use a large brush to quickly wipe out the large areas of unwanted background, then move to a smaller, soft edged brush to work on the finer details close to your objects. Before you start, make sure you duplicate your foreground object layer and then hide one copy. That way, if you make a mistake and accidentally rub out some of your foreground object, you can add it back in from the hidden layer later either with the clone tool or by simply re-cutting that area of the image



4 Correct the colours

Although this shot looks alright, it's not totally convincing. This is because the lighting and the colour balance in the background shot is slightly different from that of the foreground shot. To correct this, select the foreground layer and use the Colours menu to make slight adjustments to the levels, colour balance and saturation of the image. There are no hard and fast rules here, and the results are often subjective. In this case we've slightly increased the contrast to replicate the harsh shadows found in the background. Remember, you're trying to match the lighting and colour balance of the two images, not simply improve them.

A MORE DEMANDING JOB: A UFO SIGHTING

5 Create a composite

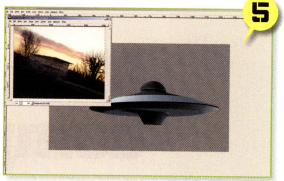
The idea of this composite is to make the shot look as though it was hastily grabbed. To do this, try to make sure that the background image isn't properly exposed, fully focused or perfectly level. The composite's foreground — the spaceship — isn't even a real photo. It's a quick 3D model that we produced in the free modelling package Blender. It doesn't need to be particularly good, because we're planning to darken and blur it beyond recognition — a sketch would do just as well. We've rendered it as a TIFF file so that it has a transparent background, making it easy to composite into our new image. To create the initial composite, copy the UFO onto the background and resize it.

6 Add blur filters

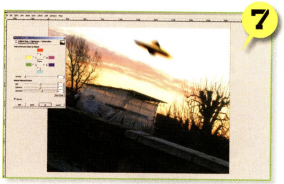
Now we need to alter the colours and adjust the brightness and contrast of the UFO so that it matches the background as closely as possible. Use the tools on the Colours menu to do this. Next, add a couple of blur filters: a directional blur makes the saucer appear to be moving, and a Gaussian blur softens the image slightly, simulating camera focus.

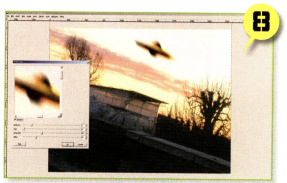
7 More colour correction

Merge the layers by right-clicking on the top one and choosing 'Merge visible layers'. Next, colour-correct the entire image using the Levels, Hue and Saturation and Colour Correction tools. The specific effects that you apply are less important than the fact that they're applied to the whole image, blending the two elements together and making it appear to be one photograph.



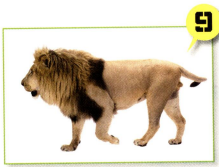






8 Add photo grain

Finally, we add a noise filter. Any camera will create a slight grain on the image, and under dark conditions, the grain will increase. CG shots by contrast have no grain at all. By applying a HSV noise filter over the whole shot, we make it very difficult to pick out the original parts of the photo from those added later. Unless you don't believe in UFOs, of course — in which case it's easy.







LINE UP IMAGES

Make your foreground layer slightly transparent and you'll be able to line it up accurately on the background and resize it to create the composition that you want before you start cutting the image out. That way, you can see right from the start exactly what you're trying to create.



A COMPLEX COMPOSITE: MULTIPLE ELEMENTS

9 Plan your vision

Have an idea in your mind of the picture that you want to create (even make a sketch if you need to) and then work out the elements that you'll need to create it. Have a look through cheap stock images from sites such as **www.istockphoto.com** and **www.dreamstime.com**. They're great places to look for all kinds of still images to use in your composites, and you can pick up high-resolution professional photographs for just a couple of dollars. Remember to look for images that you can easily isolate from their backgrounds.

10 Create a rough

Start by putting together a rough version of your image. Don't spend a lot of time getting everything perfect — just keep an eye out for any problems with perspective, lighting and colours. This isn't the time to fine-tune your composition. Once you're happy with it, you can start work without worrying that you're wasting time on unnecessary changes.

11 Refine your work

The better you can make your original cut-outs, the less you will have to feather the edges of the selection. Feathering blends your two images together well, but the downside of doing this is that it loses the detail at the edges. Try to make your edges crisp, but not jagged. Next, as with the other composites, adjust the colours to make the image appear as consistent as possible.

12 Add some shadows

Once all the images are in place and colour corrected, it's time to work on making your new objects part of the original scene. Add soft shadows with a low-opacity brush and paste in reflections (created by duplicating your object layer, distorting it and placing it at low opacity) to give your image convincing depth.

MORE ABOUT... LIGHTING

Study your pictures before you start work. Where is the light coming from, and what kind of light is it? Will you be able to match the lighting in all the images? Try to choose shots which are all lit in the same way. If there's very strong light and shadow, then you'll need to make sure that the shadows are falling in the same direction on all your images (if they're not, you can always horizontally flip one of your shots). The type of light is also important: if you're trying to combine a shot taken indoors with one taken outdoors, you're almost certainly onto a loser.

TIP... COLOUR PROBLEMS

If the image doesn't look good no matter how you adjust its colours, try reducing the saturation. When the colours are more muted, any differences between them will be less obvious. In some cases, turning your picture completely to monochrome creates a classy and convincing look.

LINUX

Build your own Linux distro

Get the OS you've always wanted and perfect every Linux install by building your own distribution, says **Graham Morris**.

WHAT YOU'LL NEED

A LINUX DISTRO
Here we'll be using Fedora Linux. We recommend that you install version 8 or higher (see *APC*'s March cover disc for version 10).

We're used to thinking of the constituents of Linux distributions as being set in stone. Most follow a certain format, opting to run either a version of KDE or the Gnome desktop environment, using a certain kernel and bundling in a few applications. But this doesn't always have to be the case. If you find yourself making the same adjustments each time you install a new distro, it might be worth creating your own customised version — one that meets your exact specifications.

Not so long ago, that was a real challenge. You had to compile everything from the source code, customise the kernel using nothing but the command line, and make all of that installable and bootable. It's the sort of hassle that requires some really in-depth knowledge and a huge amount of free time to overcome.

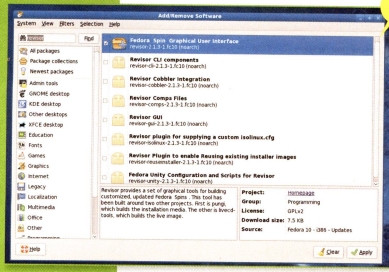
Thankfully, there's now a better way. The last few releases of Fedora have included the ability to install a package known as Revisor. It may have a fairly obscure name, but despite that it's an effective point-and-click 'build your own Linux distribution' application that anyone can use. It gives you complete control over which packages you include and how your distro is configured. If you've ever fancied yourself as a distribution builder, now's the time to give it a go.

1 Install Fedora

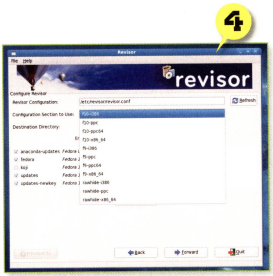
The Revisor tool has been a part of the Fedora distribution for the last few releases. This means you can use any of these versions to create your Linux distribution, although we'd recommend using the latest — Fedora 10. Installation is a fairly straightforward process and shouldn't be a problem if you've installed any other version of Linux during the last two years. After installing the operating system, the only other prerequisite is the Revisor application itself. This can be installed by clicking on the Administration menu, selecting 'Add/Remove Software' and searching for a package called 'Revisor'. Now click 'Apply' and accept any additional packages that need to be installed. If you're using Fedora 10, there's one last step that's vital to success: updating the operating system to include the latest patches. You can do this using the Update tool in the Administration menu. This is required because the version of Revisor that comes bundled with Fedora 10 is broken, so using it won't create a workable Live CD. To complete this project you'll need to either use an older variant of Fedora, or update your version 10 installation to include a fully functional copy of Revisor.

2 Lower security

After installation, Revisor can be found in the 'Applications > System Tools' menu. Click on its icon and then enter your root password. This may cause an SELinux error, in which case you'll need to change a security setting to resolve it. The issue arises because SELinux, an ultra-







tight Linux security system, keeps an eye on what certain applications can and can't do. Revisor falls outside its remit, meaning you'll need to change your level of protection from the default 'Enforcing' to 'Permissive'. To do this, load the SELinux Management application from the 'System > Administration' menu and change the current mode from 'Enforcing' to 'Permissive'. When you launch Revisor again, the error will have disappeared.

3 Getting started

From the Revisor main window, click 'Get Started'. You now have to decide how your new distribution will be booted, choosing between standard installation and Live media. The former is a good choice if you're planning to install your version of Fedora on many different machines (for example, in an office), and the resulting disc enables you to install your own distribution — complete with your chosen apps — without any prompting. However, if you want to create a distro for personal use, then the chances are that you'll find the Live media types more useful. This option creates either a Live CD/DVD or a USB stick installation of your distro, which you're able to use to boot into your desktop by simply inserting the media into your PC. As with any Live media, you'll be able to work on your desktop and use your applications, but your distro won't touch the host machine's hard drive. This is a great solution if you're a frequent user of internet cafes or other public PCs.

4 Repository information

Once your choice is made, click 'Forward' to bring up the Package Repository Configuration page. This lists the sources for the packages that are installable for your distribution, as well as the available packages for a specific hardware type. The options for this are listed in the Configuration Section to Use drop-down menu. By default



DO THIS...
BUILD A DISTRO ONLINE

If Fedora isn't your distro of choice, or you don't want to install a new distribution just to build your own, you'll be happy to hear that there is an alternative. Ingenious web site *www.instalinux.com* does all the hard work for you, compiling packages and configuration settings before pumping out a copy of your custom distribution across the internet. To have a go, head to the site and click the 'Let's Get Started' link. The next page will ask you for a hostname before enabling you to select the base-distribution for your creation. A hostname is only useful if the machine you're going to install the distribution on has one. Most don't, so you can safely leave this field blank. In the 'Distro' drop-down menu, you can choose between CentOS, Debian, Fedora, OpenSUSE and Ubuntu, as well as some more specific versions and architectures. If you click 'Continue', you'll be presented with several more options — all of which can be left with their default values. The following page asks you about your location and language, and you'll need to select a local way station for the packages that you're planning to use. Finally, select the packages that you require, choose a hard drive location for the default installation, add a username and password and then click on 'Go for it!'. A few minutes later, you'll be presented with a download link that will enable you to access an ISO of your very own distribution.

MORE ABOUT... OTHER DISTROS

The main problem with using Revisor to create your own distribution is that the base-installation and package repository will always have to be Fedora, even if you'd rather use a distro such as Ubuntu instead. Unfortunately, there isn't an easy alternative, but it's still possible to create your own Live distribution using another method. The package you need to look for is called 'livecd tools', and it should work for most of the common Linux distributions. Ubuntu included. Ubuntu users can also take advantage of a tool called 'remastersys', which can create a Live CD from your current installation. It should prove somewhat easier to use than some common Live CD applications.

TIP... INSTALL TO HD

If you want to take a custom-built Linux distribution that's running on a Live CD and turn it into a fully fledged hard drive installation, open the terminal application and type 'su' followed by your administrator's password. This command should give you administrator privileges for the system. Now type the following to launch the Anaconda installation engine: 'anaconda --liveinst'. For this to work, you need to make sure that Anaconda is one of the packages that you install when you create your re-spun distribution.



this is set to the generic option of 'f10-i386'. If you want to build your Linux distribution for a different platform, such as Intel 64-bit or PowerPC, then you'll need to use a version of Fedora running on that hardware. This is because Revisor can't build a distribution for an architecture different from the one that it's currently running on.

Other than altering the system architecture, another option you might want to change is the 'Destination Directory', which is where the final image for your distribution will be built. Beneath this option you'll find a list of the repositories that are going to be used for the packages you want to include in your distro. To save disc space, we chose to disable all of them except for the standard Fedora repository.

5 Package management

Skip the page entitled Load Kickstart Data and move onto the most important step: choosing the packages that are going to be installed on your distribution. Not only will this selection define what your distro can do without any further modification, it will also set how big your final distribution is going to be, which is especially important if you want to fit it onto a 700MB CD.

If you do need to keep package size to a minimum, we recommend opting for the XFCE desktop environment over Gnome or KDE. Both these heavyweights are ideal choices if you want a more powerful environment, but you'll need a full DVD's worth of capacity to make the distribution useful. You should also install everything in the 'Base System' category, as they're all needed for a fully functional environment.

Once you've chosen a desktop environment, you'll need to start picking applications. Note that by default the Package Selection screen only displays groups of packages rather than individual selections. So if you wanted to install GIMP, for example, you'd need to switch to the Search view, type 'gimp' into the 'Find' field and select it from the results list. For your distro you should also think about installing a web browser (probably Firefox), a music player (Rhythmbox or Amarok), a word processor (OpenOffice.org), and a video player (Totem).

6 Personalise it

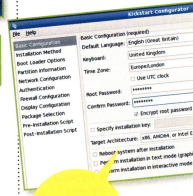
With that done, you now have the opportunity to fine-tune your distribution. The first page here is the most important, as it enables you to define both your language and keyboard layout, as well as the root password if you're creating a Live system.

You can ignore the Kernel Parameters and the Authentication page, but you should add a default network device and leave the firewall enabled for safety. You may also want to create a default user account. When you're



DO THIS... KICKSTART DEPLOYMENT

Fedora's Kickstart is a tool that generates a configuration file used to automate and standardise the installation of Fedora across many machines. Kickstart can be found in the 'Applications > System Tools' menu. It includes options to add a network, change the default language, alter the keyboard layout and adjust the time zone. There are also more advanced options to define how your hard disk is partitioned, whether SELinux is running and what services should be blocked by the firewall. Best of all, you can save the configurations you create with Kickstart to a file and load them into Revisor.



Standardisation is the theme, but Kickstart does offer flexibility.

YOU NOW HAVE THE OPPORTUNITY TO FINE-TUNE YOUR DISTRIBUTION

happy with all your customisations, click on the 'Forward' button. Revisor will calculate the dependencies (the packages required to make your selection work) and tell you how much space your distro is going to take up. If this is too much for the medium you're installing to, you'll need to click 'Back' and remove some of the packages that you selected. We found that a basic installation of XFCE and GIMP took up around 700MB.

7 Compilation time

Clicking 'Forward' once more starts the compilation process, which consists of 11 separate steps executed in the following order:

1. Packages are downloaded.
2. The filesystem is created.
3. Packages are installed.
4. The system is configured.
5. Networking is configured.
6. The RAM filesystem is created.
7. The system is relabelled.
8. Bootloader menu is installed.
9. Filesystems are unmounted.
10. Kernel image is compressed.
11. The ISO image is created.

The speed at which all of this is accomplished is dependent on the number of packages you've chosen, the speed of your internet connection and the capabilities of your machine, but expect to give it at least an hour. Our Intel Core 2 Duo 6400, 2.13GHz machine took around 90 minutes to build a 700MB-sized distribution.

8 Burn the disc

After the file has been generated, you'll find the final ISO located in a '/srv/revisor' subdirectory (as long as you didn't change the destination earlier). Our file was hidden in the Live folder and was named 'Fedora-10-Live-i386.iso'. Now you need to burn this file to a blank CD, which you can do from within Fedora by right-clicking on the ISO file and then selecting 'Write to disc'. Remember that you have to be careful when writing ISO images, otherwise you could end up burning just a single file to your disc. Always ensure that you're using the file as an image when you copy its contents.

9 Give it a spin

When the burning process has finished, you're ready to launch your freshly squeezed Linux distribution for the first time. Insert the disc into the optical drive of your machine and reboot, making sure that your system is configured to boot from the optical drive. If you need to configure this, you can do that either through your system BIOS or by using a boot-time device selection menu. BITS

RETRO GAMING

Relive the magic of old DOS games

Play classic games in Vista! Dust off your old games and get them running like new on your PC, says **Joe Cassels**.

WHAT YOU'LL NEED

AN OLD DOS GAME
Take a look through your old game collection and find a game that you want to get working again.

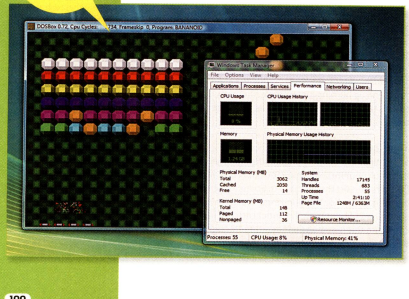
DOSBOX
A DOS emulator that will allow you to play your old games.

Certain computer games earn a special place in our hearts. It could be because they were iconic or they represent a particular time in our lives. In some cases, it's a good old-fashioned addiction. Sadly, though, some of these games are lost to us even if we still own a copy because they no longer run in the latest versions of Windows or on a modern PC. The less popular titles or those produced by defunct software houses won't be developed further and are almost certainly lost to the sands of time. However, with a little cunning it's possible to coax them out of retirement and enjoy them once more. Who cares if the graphics were blocky and the sound rivalled that of a singing birthday card? A good game is a good game, and we shouldn't be denied access to it by the ongoing march of progress.

The first thing to consider when trying to resurrect an old game is the architecture that it was designed for. Programs that launched within an earlier version of Windows require a different approach from those that ran under DOS, the simple operating system that preceded Windows and upon which the early Windows incarnations ran.

It's possible to get Windows apps running in compatibility mode (see the 'Compatibility settings' box, right, for more information). However, compatibility settings aren't all they're cracked up to be, and whether they work or not seems to be a hit-or-miss affair. An alternative approach for old Windows games is to run them directly in the version of Windows concerned using virtualising software such as Virtual Box (**www.virtualbox.org**). For this to work, you need access to a legal copy of the version of Windows concerned. Install Windows within Virtual Box and then install the program itself. It's a bit convoluted, but it's more reliable than compatibility mode. Alternatives to Virtual Box include VMWare Workstation (**www.vmware.com**) and Virtual PC (**www.microsoft.com/windows/products/winfamily/virtualpc**). Both products are free.

You could take a similar approach to DOS-based games, but there is a neater solution. DOSBox (**www.dosbox.com**) is essentially a virtual PC running DOS, but it's dedicated exclusively to this purpose and makes it easy to run executable files stored on your hard drive. You can even create Windows desktop shortcuts to launch games in DOSBox.



If your game is running too slowly, adjust its CPU cycles or skip some frames.

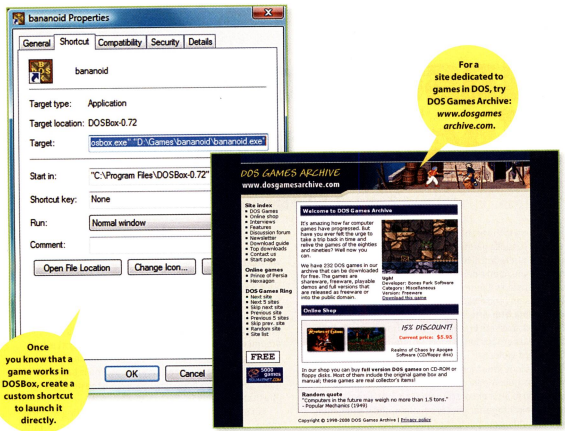
LAUNCH DOSBOX

DOSBox installs as a standard application. At launch, you will be presented with a command prompt-style window displaying 'Z:\>'. You need to mount a folder from your hard drive that will act as the C drive for DOSBox. It's a good idea to set up a separate folder for your DOS games so that you can access them all from here. We recommend putting them in a folder on the root of drive D — for example, 'D:\games' — and then mounting this as the C drive. To do this, enter: 'mount c d:\games'. Once this is mounted, you need to change to the C drive in DOS, so enter 'C:'. The prompt changes to 'C:\>'. You're now working within your games directory.

To launch a game, you need to move to its directory and then enter the executable file name. So, if there's a game called Bananoid within a directory of the same name in your games folder, you need to enter the following: 'cd bananoid'. Next, hit 'Enter' and then type 'bananoid' to launch the game. You can then navigate in the game using the keys or mouse, depending on its instructions. In some cases, DOSBox captures the mouse pointer, which can make it difficult to switch between different windows. The keyboard shortcut of Alt+Tab should always work if you need to change windows in a hurry.

EDIT THE CONFIGURATION

You'll need to mount the C drive and navigate to it each time you launch DOSBox unless you edit the configuration file 'dosbox. conf', which you'll find in C:\ Program Files\DOSBox-0.72. Open it in Notepad and add the mount commands to the bottom of the file below 'autoexec', which lists commands to run at startup very similar to the old Windows



'autoexec.bat'. Assuming that your games are in the D:\ games folder, you'll need to add the following: 'mount c d:\ games'. Hit 'Enter' and type 'c:'. Save the file and launch DOSBox again. This time, it should open showing the C:\> prompt. You need to navigate to the folder containing the game that you want to play and launch it by entering its executable filename as before.

CREATE A DIRECT SHORTCUT

Editing the autoexec section of the configuration file is probably best if you have a long list of DOS games in your folder. However, if you just have one or two old favourites that you want to play, it may be much neater to use a custom shortcut. To do so, right-click anywhere on the Windows desktop and choose 'New > Shortcut'. In the location field of the Shortcut wizard, enter the location of DOSBox's executable, followed by that of the game you want to play, enclosing both in quotation marks. So to launch Bananoid as we did above, the shortcut location must be: '"C:\ Program Files\DOSBox-0.72\ dosbox.exe" "D:\ Games\bananoid\bananoid.exe"'. This is assuming that DOSBox was installed to C:\Program Files\DOSBox-0.72 and that the location of the game is unchanged. Click 'Next' and enter the name you want to use for the shortcut — the name of the game would make sense. Finally, click 'Finish' to complete the shortcut.

Double-click your shortcut to test it. If all's working well, it should launch DOSBox and start your chosen game. The icon for the shortcut will be the default DOSBox icon, but you can change this if you want. Right-click your shortcut and choose 'Properties'. On the Shortcut tab, click 'Change Icon'. Click 'Browse' and locate the icon file that you want to use instead. Click 'Open' followed by 'OK' twice to set the new icon.

RUN GAMES FROM A CD

Some DOS games run from CD, in which case you'll need to mount a CD drive. This is a similar process to mounting the C drive, although you'll need to use some switches to identify the drive as a CD one. To stick with convention, it's best to mount the CD drive as drive D. At the command prompt in DOSBox, type: 'mount d e:\ -t cdrom'. This is assuming that drive E on your Windows PC is your CD/DVD drive.

TWEAK PERFORMANCE

The virtual PC created by DOSBox is similar to a 486 in performance. This is desirable because today's machines could end up running games so quickly that they'd be impossible to play. However, sometimes games run too slowly in DOSBox. To resolve this, tweak the number of CPU cycles devoted to it.

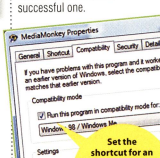
Launch Task Manager while DOSBox is running to see what resources are being used. To speed up the game, press Ctrl+F12. You can do this repeatedly until DOSBox is taking up over 95 per cent of your CPU use. To slow the game down, press Ctrl+F11. If you've exceeded 95 per cent of your processing power and the game is still running slowly, try skipping some frames by pressing Ctrl+F8. You can decrease frame skip again by pressing Ctrl+F7.

When you've found some settings that work well for you, check the title bar of the DOSBox window. This will contain readings for CPU cycles and frame skip. Make a note of these so that you can restore them in the future. LTUP

DO THIS... COMPATIBILITY SETTINGS

If the game you want to get working ran OK under an older version of Windows, it may be worth trying to get it running in Compatibility mode. It's pretty easy to apply, so is a useful first port of call for problem programs. However, the downside is that it frequently doesn't work.

Right-click the program shortcut and choose Properties, followed by the Compatibility tab. Now tick the box marked 'Run this program in compatibility mode for' and select the version of Windows you want to emulate from the list. You can also use lower display settings by selecting the tickboxes for 256 colours and 640 x 480 resolution. Try different combinations to find a successful one.



MOUSE CAPTURE

In most games that use the mouse, DOSBox detects that mouse control is needed. When you click on the DOSBox window, the mouse is captured and used by the game. In some cases, this detection doesn't work. If this happens, press Ctrl+F10 to manually capture the mouse. To release the mouse, use Alt+Tab to switch to a different window.

3D MOVIES

Mastering Machinima

Discover the power of 3D real-time filmmaking with Reallusion's iClone 3, say **Ricky Grove** and **James Martin**.

WHAT YOU'LL NEED

ICLONE 3

A free version is available at *www.apcmag.com/machinima.htm*.

Machinima is the art of creating movies from real-time 3D sources, usually games. That's fine for many projects, but if you want full control over both the creative process and its output, you need a dedicated tool.

Reallusion's iClone is one of the best, and you'll find a free version (and a sample project) at **www.apcmag.com/machinima.htm**. After you've installed it, you can import these extra assets by copying them from our web site to the Reallusion\Custom\iClone 3 custom folders in your Documents folder.

The iClone interface is simple. On the left you're able to access your media and on the right you'll find tools that allow you to alter or control your media. The centre section is the main 'stage' for your production, and it's here that we'll be adding our custom project, characters and voice files. Select the Project tab (at the top of the screen) and then the Custom tab.

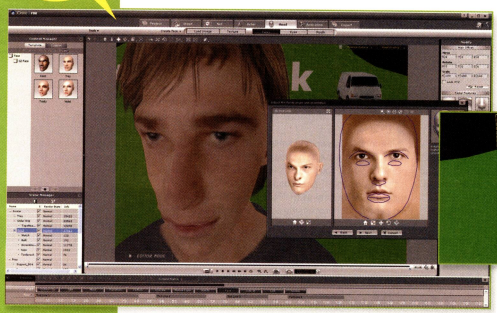
Now load the 'APC Base Project' file by double-clicking on it. This will load the basic working scene for the film. It consists of the Green Screen Slope, the Studio Warehouse and the Grip Van, all of which are placed inside your stage. We're going to create a simple movie here that involves a conversation between three characters, with a camera flying around the set until they finish creating the *APC* web address. It's a straightforward project, but it touches on all the major areas that any of your own machinima projects will need to cover.

SET THE STAGE

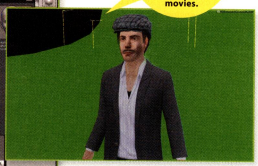
Use the tools at the top of the screen to move around the stage. The Select, Move, Rotate and Zoom tools are separated into two sections: one (on the left) is for moving around on the stage itself, the other (on the right) is for selecting the props and characters and moving them within the scene. When a character or prop is selected, you'll see a yellow bounding box around the item telling you that it's active.

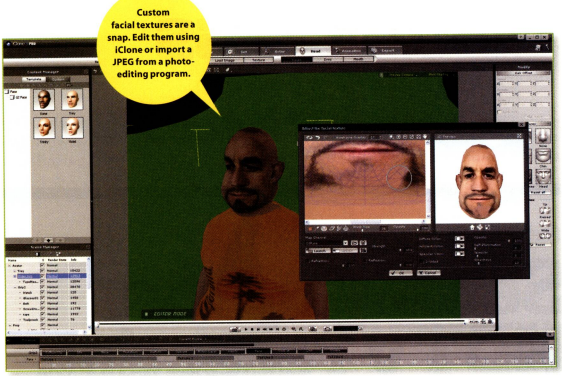
Let's begin adding our other content, starting with the characters. Go to the Actor tab, then click the 'Avatar' button and select the Custom tab (on the left) once again. Locate and double-click on each avatar (Ted, Stan, the two studio grips and their Director) one at a time and place them on the stage. To do the same for props, look in the Set tab and click the 'Props' button at the top of the interface. There should be three: the *APC* web address, the K prop and the Scissor-Lift prop. Place these on the stage and use the Move tool to put them all on-screen together. The Zoom tool will allow you to move the preview camera closer or further away from the

Using iClone, you can import any 2D image and map it to the face of your character. Use a front photo and a side photo of yourself as a test.



Download Moviestorm to create your own animated films; the site also contains high-quality movies.





characters. To speed up the zoom, hold down Shift.

ASSEMBLE THE AVATARS

Double-click the Stan character (the old, fat grip character), select the Animation tab (at the top) and then click the 'Facial Animation' button to begin importing your voice files. We've provided some examples, but you can make your own if you prefer. Select the 'Import' option from the Modify panel and navigate into Media/Dialogue. Select the line 'Stan 1'. This will automatically apply the WAV file to the character and create instant facial animation based on the soundwave. Repeat the process for the second two characters, Ted and the Director.

Open the timeline by pressing F3 and access the voice tracks for each character. Do this by clicking the 'Face' button for each character. Use the track list located at the top of the timeline to add each character's timeline track. You can expand or contract the length of the timeline by tapping the end of its block icon. Arrows will appear that enable you to stretch out the timeline. Add each dialogue track, one right after another, to the timeline by clicking further down the length of the timeline for each character and then importing the voices in order. Repeat this process for each character until you have all of their dialogue on each individual timeline in order.

CUSTOMISED CHARACTERS

Here is a good point to branch away from following this project exactly and customise it a little. iClone 3 makes this simple. Save your project with a unique name first ('Project > Save Project') so that you can come back to the end point of part one easily. Start by swapping any of the characters we've created for the stock characters that come with iClone. Use the Select tool to double-click on any character in the scene and delete them; then select the Actor tab and look through the available stock characters on the left under the Template tab. Try swapping the Ted character for the Jack Casual character.

You can also morph the characters' body type, head shape, eyes and nose. Even the texture map that covers the face can be reworked or copied into a program like Photoshop and imported. Try removing the Director's cap and changing the way that his face is shaped.

Double-click on the Director and click the icon that looks like a house; this will centre him on the screen. At the right, under Body Style, pick 'Plump' and double-click. Now the Director is a stocky, heavy-set guy, but he's a bit too small. Just underneath Body Style, you'll see the heading 'Adjust proportions'. Move the Length slider to the right until he's back to the same height that he was before. At the top of the main iClone screen, you'll find the Head options. Click the heading and, on the right, you'll see a full set of facial features that can be modified as much as you like.

Another way to customise your scene is adding facial animations to the lines that you've imported or to any custom voice recordings that you may have made. Click the Facial Animation tab and, making sure that one of your characters is selected, click 'Indifferent'. Hit the spacebar and play through the character's lines on the timeline. You'll see that he's adopted the facial expression you've chosen. These facial expressions can be keyframed; place your timeline marker where you want a new one and click a different option.

LIP SERVICE

CrazyTalk — a Reallusion program specifically designed for facial animation — is supported as an import file inside iClone 3. CrazyTalk is a great way to get characters talking in less-advanced machinima projects. You simply provide it with a 2D image of your character's face and the dialogue, and it warps the image to give it the illusion of life, with full lip-sync. You can then assign emotions to each part of the line or, in the more advanced version, completely puppeteer the character. The movies that it exports can then be brought into other applications as a texture, or used on their own. After that, the trick is pretending that the effect was much harder to pull off than it actually was — or, at the very least, more expensive... EOTE

DO THIS...
CREATE CUSTOM CONTENT

One of the problems that comes with creating machinima using non-game software such as iClone is finding and/or creating custom content. The Google Warehouse is the perfect solution for this problem. Since Google released Sketchup, it has also created a massive online warehouse where every conceivable kind of 3D model is stored and available for free. Need a new sofa for that living room scene that you're shooting? Google has 4,600 of them available for royalty-free download. You can get lost for hours just searching the database.

So how do you get this content into iClone 3? Reallusion's 3DXchange is able to convert Sketchup's basic '.skp' format into to the iClone 3 '.vns' format. 3DXchange also imports the '.obj' format, so free models from *www.turbosquid.com* and *www.renderosity.com* are also easily imported into iClone 3.

TIP...
FILM FESTIVAL

There are three major machinima film festivals: the annual UK-based Cambridge film festival now has a sizable section devoted to machinima; the American Academy of Machinima Arts & Sciences (AMAS) holds its all-day festival and awards ceremony in New York City every November; and lastly, the Machinima Expo is a virtual film festival held in Second Life. All of these festivals hold talks and workshops as well as sponsoring a film competition that features screenings of the award winners and other quality films from among those submitted.

IN THIS SERIES

Learn how to network every digital device in your home, everywhere from the home theatre to the bedroom. This is the ultimate home-networking tutorial on how to turn your castle into a 21st-Century digital paradise.



APC EXPERT

THE CONNECTED GUY

David Neiger will be building the connected house in a real home and will be filing regular columns and updating the *APC* web site as he goes along. David is a qualified engineer with many years of networking, IT implementation, consulting and project management experience.

WHAT'S NEXT?

PART 5
MAY '09
CONNECTING THE HDTV TO THE SOUND SYSTEM

PART 4 CREATE THE ULTIMATE CONNECTED HOME

Setting up the HDTV reception

We're now finally building our home theatre, starting by setting up our HDTV and ensuring it's connected the right way.

One of the most important parts of our Connected Home is the home theatre system in our lounge room. This will be the hub of our home entertainment system that will also feature a surround sound system and streaming devices to play media content around the house.

RIGHT ANTENNA FOR HDTV

But one of the most important parts of a high-definition home theatre system is to have a suitable digital antenna and appropriate cabling. This is often ignored, as people pay thousands for an HDTV only to connect it to any old aerial. Even if you have a perfect analogue signal, this does not mean you will have ideal digital television reception.

Most older antennas are not designed to receive channels 11 (capital city 10 digital) and 12 (capital city ABC digital), which will mean that your digital tuner will be unable to receive all of the available digital TV broadcasts reliably.

One of the promises of digital television, when it was introduced in early 2000, was that it would give you perfect pictures and sound every time. Unfortunately, this is not the case, as numerous discussions on the DTV Forum (**www.dtvforum.info**) will testify to.

Digital television, like any digital signal, relies on the receiver (in this case the set-top box, digital tuner or tuner card) receiving the data as accurately as possible. Whilst the format of the digital signal does allow for some error correcting, if correction is not possible data is lost. Depending upon the severity of the errors, this may result in digital artefacts (blocking or coloured blocks across the picture), the picture freezing, pops and clicks in the audio, through to a total loss of picture and sound in more extreme cases.

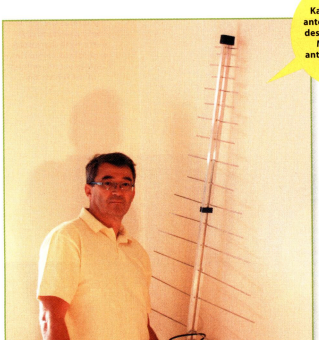
If you don't live in an ideal reception area the chances of errors in the digital signal increases since the signal is weaker, distorted or affected by interference. As a general rule, if you cannot receive a high-quality analogue television signal (one that is free of ghosting, snow or interference) you will have trouble with digital television, especially when watching the high-definition channels. There is no point spending thousands of dollars on a 'top of the range' high-definition television if the signal you are receiving is poor and full of errors!

It is not possible to determine if this is happening just by watching the picture, since the receiver may be correcting an unreliable signal, which will in turn result in sporadic unreliable reception. The signal and quality meters built into most set-top boxes and tuner cards are also a poor indicator of signal quality, since most of them just measure the signal strength.

The equipment required to measure the accuracy and reliability of a digital signal is specialised and expensive, so don't expect your $100 set-top box to do the same job. The other problem that can affect digital television is that, ironically, the signal may be too strong. Your signal strength meter may show 100% but because the signal is too strong, digital distortion (clipping) may occur, which will result in data loss.

If you are going to do things properly (as this Masterclass aims to do) then you will need to install a proper digital antenna using a properly qualified expert who has the appropriate training and digital test equipment. Unlike analogue television, where you can see whether the signal is good or not, digital television relies upon a reliable and accurate data stream, which is not so easy to measure.

Our Connected Home is a real home in a Melbourne waterfront suburb with poor reception. So we hired the



Atomir Kamber, a digital antenna expert who designs and installs MATV (master antenna television) systems.

Missed a tutorial?

Go to www.imagshop.com.au for back issues of APC



The antenna splitter, dating back to the 1980s, was completely corroded.

services of a digital antenna expert, Atomir Kamber. He is an engineer with over 16 years of experience designing and installing MATV (master antenna television systems). He specialises in larger and more difficult installations and is the person to call if you have serious reception problems in larger systems such as apartments and hotels. When he comes to your place, he is equipped with a variety of antennas, high-quality coax leads, signal amplifiers and, most importantly, a portable digital signal analyser.

It did not take Kamber long to find out why we were not obtaining good digital reception in our Connected Home. The antenna splitter, which was installed back in the 1980s, had completely corroded and needed to be replaced with a high-quality sealed unit resistant to corrosion.

Kamber also found that all of our plugs and cables were poorly made from cheap components, resulting in significant signal loss and distortion. We replaced them with high-quality sockets crimped to quad shield coax. Since the cabling is only as good as the weakest link, Kamber replaced all of our old electronics store fly leads with the custom crimped leads made from the same high-quality quad shield cabling.

If you no longer require analogue signals (for channel 31 or older VCRs and DVD recorders), Kamber recommends that people install "log-periodic digital antennas, since they are much smaller and optimised for digital signal reception."

Log-periodic antennas have several advantages over the combination VHF/UHF antennas installed in most people's homes. Firstly, they are tuned specifically to the frequencies used for digital transmissions and reject signals from the lower VHF bands: Bands I (channels 0-2) and II (channels 3-5A and FM radio) as well as impulse noise (from electrical devices) that can otherwise cause the digital signal to break up. Since they are smaller they are easier to install and less affected by wind and birds. Kamber also advises that you check where the antenna is made, since his experience is that high-quality European or Australian-made antennas are more durable and provide better performance than cheaper antennas.

CABLING THE TV

Speaking of cabling, most manufacturers do not actually include the necessary cables inside the box. It is frustrating to spend good money on a high-end Blu-ray or upscaling DVD player only to find that the unit comes with almost useless composite cables that will give you no better than VHS picture quality.

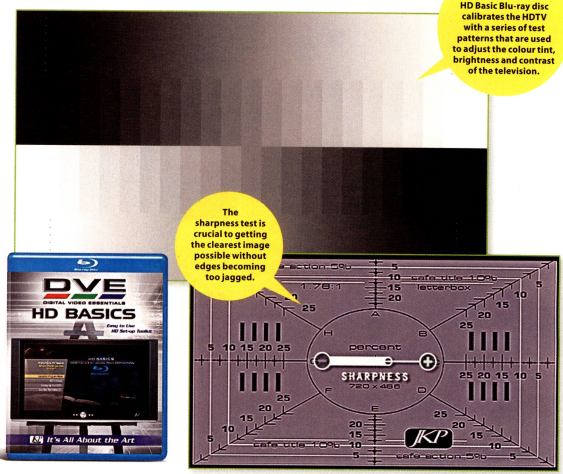
The best way of connecting your DVD or Blu-ray player to your television is via HDMI cables. HDMI cables transmit the full digital signal with no conversion to analogue, giving you the best picture and sound possible. The other advantages of HDMI are that both audio and video is sent over the one cable, it supports full 1080p high-definition playback and full multi-channel high-resolution audio and, if you have a compatible television and player, control signals can be sent over the HDMI cable, allowing you to control the player from the television remote.

While all current-model televisions support HDMI, some older projectors do not. If your home theatre projector does not support HDMI then the next best option to use is component video. Component video uses three analogue lines to transmit high-definition video, although you will require separate cables for audio. The trouble with component video is that digital signals need

MORE ABOUT... HDTV LOCATION

Once the antenna is sorted out, the next factor to consider is where to put the television. A large screen television uses a lot of power and consequently generates a lot of heat (especially plasmas). This heat has to go somewhere to prevent your television from overheating, so ensure that your television is properly vented and not too close to curtains or other obstructions to adequate airflow.

Televisions work by either generating light (plasma, CRT) or allowing light to shine through a screen (LCD). Since the television cannot generate "dark", the screen must be kept as dark as possible otherwise blacks and dark parts of the picture will tend to be greyed out. This means that you should position the screen away from any sources of direct or reflected light (such as directly under lamps or opposite windows).



MORE ABOUT VIEWING ANGLE

Another factor to consider is the viewing angle. Whilst LCD televisions have improved dramatically over the last few years, they still work best when you view them from as close to the front as possible. The closer you are to the front of the television the better the colour and contrast will look. Plasma televisions do not suffer from viewing angle artefacts as much as LCDs, but again they are best viewed front on rather than from the side. While it may look neat having the television tucked away inside a cabinet it makes it very difficult to access cables when you add or replace components. A typical home theatre system consists of at least the television, a DVD or Blu-ray player and a surround amplifier together with all associated cables. If, like us, you decide to add a media centre PC or streaming media player some time in the future, it can become a real hassle moving out the TV and components or turning the cabinet around in order to access the cables. A better option is to purchase an open shelf cabinet that allows you to easily reach around the back when you need to adjust cabling.

to be converted to analogue (resulting in signal loss) and some Blu-ray players do not support full 1080p high-definition video over component connectors.

Really old televisions (including some early-model LCDs) only have S-Video or composite (yellow jack) connectors. These connections do not support high-definition playback, so if your television only has these connectors you will not see the benefit of a new Blu-ray or upscaling DVD player.

As with many things in life, with cables you generally get what you pay for. A cheap HDMI or set of component cables may work, however in my experience these cheap cables tend to be easily broken, particularly if you have to reconnect them. I personally have had cheap HDMI cables (included with devices) fall to pieces or break down over time. It's just not worth it, particularly if you have spent hours trying to troubleshoot why your new DVD or Blu-ray player will not work! On the other hand, people can spend thousands of dollars on super-premium cables that promise all sorts of benefits. Whilst these super-premium cables may give better performance on extremely long cable runs, you are unlikely to be able to see the difference on a short 2-5 metre cable connecting your television to your player.

When purchasing cables it is always better to go a little too long rather than a little short. A 1-2 metre cable might just make the distance between your player or television but if you decide to move either device you may need to stretch the cable to its limit, putting strain on the cable or the connectors. If the cable is too long you can always tuck it behind the device; if it's too short you are stuck.

CALIBRATING THE TV

After you have plugged the television into your DVD or Blu-ray player, the next step is to use a calibration disc to adjust the television setting for optimal quality. Many people mistakenly believe that you just simply plug the television in and turn it on. If however if you want to obtain the best pictures possible, spend the $30 or so on a calibration disc and do it properly.

The calibration disc contains a series of test patterns that can be used to adjust the colour tint, brightness and contrast of the television to provide the highest-quality pictures for your specific viewing environment. The Digital Video Essential HD Basic Blu-ray disc (get it on **amazon.com**) contains step-by-step instructions on how to obtain the best possible picture from your television. This involves displaying a graduated test pattern and ensuring that you see all of the grey steps. If the picture is too dark, the dark greys will blend into black, and conversely if the picture is too light the light greys will be washed out.

Once you have your television set up, you may find that pictures from your old DVD player and VCR look awful on the big screen. That is because DVD pictures, which looked really good 10 years ago on smaller televisions, are not high definition and accordingly look blocky and blurry on larger high-definition televisions. The solution is to replace your old DVD player with either a full high-



Sony's 200Hz Motion Flow LCD displays the smoothest ever HDTV image on an LCD!

NOT ALL UPSCALING DVD AND BLU-RAY PLAYERS ARE CREATED EQUAL

definition Blu-ray player or at least a high-quality upscaling DVD player.

Upscaling is a technique in which sophisticated electronics inside the DVD or Blu-ray player analyse the picture to literally fill in the gaps. The player works out what detail has been lost from the picture and as best as possible recreates the information to produce near-high-definition pictures that look considerably better than standard-definition output from an older DVD player.

However, not all upscaling DVD and Blu-ray players are created equal, and surprisingly price is not the best guide. At *APC* Labs we use the HD HQV benchmark Blu-ray from Silicon Optix to put DVD and Blu-ray players we test through a gruelling digital obstacle course. These tests are brutal, as they show just how well a player handles noise reduction, smoothes jaggies, and deals with cadence (jerkiness that can occur when films are converted to television). The Benchmark DVD, also from Silicon Optix, is really good when testing upscaling DVD players as the disc quickly shows whether the player properly upscales a DVD or just blurs the image to make it seem less blocky.

Whilst upscaling DVD players are good, none of them can create true 1080p high-definition pictures from highly compressed 576p source materials. If you want the best high-definition experience, spend the money and buy a good full high-definition Blu-ray player that supports 24p. 24p means that the player sends 24 full frames of video to the television every second, which is exactly how films in the cinema are played back. 24p allow you to see the movie exactly as it was made without any distortions or jerkiness caused by converting the movie to 50 ½ frames per second (for the PAL television system used in Australia) or 60 ½ frames per second (for the NTSC television system used in the US).

Once you see full high-definition Blu-ray on your large TV, there is no turning back!

MORE ABOUT... MASTERCLASS PARTNERS

The products and services featured in this Masterclass are picked because we believe they are the best available. We do not have an advertising relationship with the providers.

- The antenna and installation were provided by Melbourne Digital MATV Systems (***www.digitalmatv.com.au***). Ph: (03) 9589 2857, or Mob: 0416 17 1111.
- The Sony HDTV is one of the new 200Hz refresh rate Motion Flow range released in Australia. It provides the smoothest of all LCD fast action pictures.

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What's hot & not
TECHNOLOGY THERMOMETER



THE HOME TELEPHONE

With the advent of email, Facebook and our new friend internet telephony, is there any reason why any of us should ever pick up this antiquated device ever again?

DOWNTIME REVIEW

Sony Walkman W (wearable) series

Just when you thought the Walkman couldn't get any smaller, Sony goes and makes one that is built into its earphones.

As popular as MP3 players have become, they all pretty much look the same as far as their overall appearance goes. Not any more. Sony has just released the W series of Walkman, which breaks away form the standard look of a rectangular box with a small LCD screen slapped onto the front of it. The W-Series is designed to be small, lightweight and unobtrusive, with no hanging wires or bulky hard drive units that take up space in the user's pocket.

To do this, the units' hardware has been built into the earpieces, where they are tucked out of the way on the user's head, also dispelling the need for ugly, cumbersome wires.

As you can see from the images, the W-Series Walkman has no screen, so a new content management system called Zappin was created especially for its use. Music plays in shuffle mode by default but, with a simple press of a button, Zappin mode allows users to browse through tracks by playing a snippet of the most recognisable part (usually the chorus) of each song. This is surprisingly easy to use, as it doesn't require you to know the actual song titles of everything on the player: once you come across a song you want to hear, a press of the jog button will start it from the beginning. Easy!

Christopher Zammit







five
HI-POWER @ PLAY



BUILT CARGO LAPTOP SLEEVE

01

Most laptop sleeves are pretty much just what they say: a means to keep the outside of your favourite shiny notebook scratch-free. The Cargo laptop sleeve from Built takes the concept one step further by adding external pockets for the other gadgets in your life. (Thus transforming itself into something more akin to a streamlined bag than a simple sleeve.) With room for mobile phones and stationery or MP3 players (and whatever else you want to smuggle about), this is a convenient way to haul all your junk around in a stylish-looking neoprene package. They are available in a range of colours and sizes to suit most laptops.

CONTACT Built
ONLINE www.until.com.au/stockists
PRICE $64.95–$79.95

MOSHI CLIP-ON HEADSET

02

A unique design accessory for your ears, the Moshi headset is a compact clip-on headset for anyone who carries a media player. Light-weight — for those people who don't like feeling too much pressure or weight on their ears — the Moshi clip-ons deliver vibrant sound quality whilst blocking out all excess noise externally. With just the right amount of cord length (perfect for anyone who hates all those tangling lines), this headset keeps all the music where it belongs — without slipping away. Available with interchangeable coloured side plates (blue and red), the Moshis sound and look great.

Helen Chen

CONTACT Moshi
ONLINE www.lomis.com.au
PRICE $14.95

iPHONE 3G PORTABLE GENIUS

03

You don't have to be a genius to use an iPhone 3G. But if you want to get the very most out of yours, put this comprehensive Portable Genius guide to work and start ramping up the pace. Want to email attachments twice as fast? Talk and browse at the same time? Sync your iPhone 3G with multiple computers? You'll find cool and useful Genius tips, full-colour screenshots and pages of easy-to-access shortcuts and tools that will save you loads of time and let you enjoy your new iPhone 3G to the max. After all, it's not just a phone with a built-in MP3 player, The Portable Genius will make it easy for you to walk-the-walk while you talk-the-talk.

CONTACT Wiley Publishing
ONLINE www.johnwiley.com.au
PRICE $32.95

LOGITECH SQUEEZEBOX BOOM

04

Brilliant! A plug-and-play MP3 ghetto blaster. It's retro and modern at the same time! This new twist on an old device introduces an internet radio into a portable music player that you can take anywhere (providing you can get an internet connection). With the ability to play most music formats through its 30-watt digital amplifier and speakers, the Squeezebox pumps out a surprisingly rich, clear, vibrant sound that will satisfy even the most discriminating ears. Dual internal antennas and auto network hookups make setup and connection a breeze. The best part is it can access your iTunes libraries on your PC! Party on!

CONTACT Logitech
ONLINE www.logitech.com.au
PRICE $649.95



EAGLE EYE BLU-RAY DISC

05

A cleverly devised plot sees two seemingly everyday people forced to work together to survive a series of deadly and inexplicably linked events. Jerry (Shia LeBeouf) and Rachel (Michelle Monaghan) find themselves hunted by the FBI as they attempt to complete dangerous and bizarre tasks as ordered by a mysterious female cyber-terrorist — who makes contact with them using any technical device that can deliver a message. If they refuse to do as she says, Rachel's son will die. Jaw-dropping action scenes and the amazing ways the characters are manipulated makes this a must-watch for anyone with a pulse.

- CONTACT Paramount
- ONLINE www.paramount.com.au
- PRICE $43.95

BABYLON A.D. BLU-RAY DISC

06

Set in the not-too-distant future, Babylon A.D. sees Vin Diesel once again playing the role of the tough-but-fair hard-arse hero. Hired to escort a mysterious (and, not surprisingly, very hot) woman from eastern Europe to America, Vin finds himself in the middle of a feud between a burgeoning cult and a group of freedom fighters who both want the girl for their own reasons. Babylon A.D. has an almost post-apocalyptic atmosphere that at time feels like it's trying to emulate Blade Runner. The combination of an interesting plot, some good action scenes and Vin Diesel in love provide enough entertainment to keep most viewers interested.

- CONTACT Twentieth Century Fox
- ONLINE www.foxmovies.com
- PRICE $39.95 (Blu-ray)

SUCK U.K. SUN JARS

07

Everyone is looking for ways to save power whilst not having to give up the finer things in life. A U.K. company called SUCK U.K. (worst company name... ever) has come up with the Sun Jar. What is effectively a solar panel and a lightbulb placed within the lid of a jar, the Sun Jar is a complete unit that delivers a limited amount of light without using electricity or harming the environment. We'll not kid ourselves here and say that these are bright enough to use as normal lights, because they aren't. What they are good for is as nightlights for the kids, or for making it possible to see your keyboard while working in the dark. Novel but gimmicky.

- CONTACT Suck UK
- ONLINE www.until.com.au/stockists
- PRICE $75

PIONEER DVR SPY WATCH

08

We've all seen the old James Bond films from the seventies in which Sean Connery uses a camera hidden in his watch to record what the bad guys are up to. It's taken thirty years but Pioneer has finally come up with the real thing. With a 3-megapixel camera built in and video-recording capability, the Pioneer DreamVision Spy Watch has 4GB of memory that can hold up to five hours of video. The only drawback is there is no screen, but the included software makes uploading the video footage from the watch to your PC a simple process using a standard USB connection. Now we just sit back and wait to see if the public uses this for good or for evil. Hmmm...

- CONTACT Pioneer
- ONLINE www.pioneer.com.au
- PRICE $199

Quikfix
New release



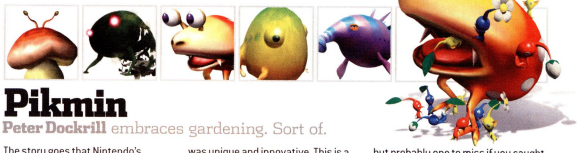
NAMCO VIRTUAL ARCADE

Heading to an Xbox 360 near you in April is the Namco Museum: Virtual Arcade. Over 30 titles spanning 25 years of old-school classics will be available, including Galaxian, Super Pac-man and Pole Position. Online leaderboards keep track of who you need to knock-off to get the top spot.



COD4 MAP PACKS ON THE WAY

At around the same time as this mag is in your sweaty little hands, the World at War Map Pack 1 will be ready for your download loving. Three maps are detailed, basically one for each story thread: Berlin, Japan and another in a bomb-ravaged subway. Map Pack 1 also expands the four-player-co-op-zombie kill-crazy-rampage with new weapons and features.



Pikmin

Peter Dockrill embraces gardening. Sort of.

The story goes that Nintendo's legendary game designer, Shigeru Miyamoto — creator of such classics as Mario, Zelda and Donkey Kong — is *into* his gardening. So into it, in fact, that when devising concepts for the never-released project 'Mario 128', he included gardening-style gameplay ideas, inspired by the time spent tending his own garden. Mario 128 never arrived, but the gardening ideas were shoehorned into another project, Pikmin, which was released as a launch title for the GameCube in 2001. The game was a minor hit, and with good reason: its cute puzzle/gardening/RTS-style gameplay was unique and innovative. This is a straight port of the 2001 game, with a Wii-tailored control scheme the only new addition — hence the budget pricetag. (Nintendo is planning a number of such GameCube re-releases under the banner 'New Play Control'.)

You play as Captain Olimar, whose spaceship crashlands on a 'strange planet', and you've only got 30 days to fix your ship and escape before your life support gives out. Luckily, you've got the little Pikmin to help you: a mysterious plant-like species that you can propagate and pluck out of the ground to assist you with various tasks. All up, Pikmin is still a winner, but probably one to miss if you caught it the first time around. If you're after a fresh adventure, an all-new Pikmin title is in development for the Wii, and that could be the one to hold out for.

AVAILABLE PLATFORMS: ~~PC-DVD~~ ~~XBOX 360~~ Wii ~~PS 3~~

CONTACT Nintendo
ONLINE www.nintendo.com.au
PRICE $49.95

✔ Fun puzzle game; new control scheme; budget price.

✖ Just a port of an eight-year-old title.

VERDICT ★★★☆☆



Dead Space

Troy Coleman is screaming something about running out of oxygen.

I never thought I'd utter the following statement without the slightest hint of a giggle: EA has been making some decent titles lately. OK, your eyes have no doubt scanned the verdict, noticed the PC score and then reread my initial statement... bewildered? Well, I played Dead Space on both 360 and PC, and I'm sorry to say while the 360 version is great, the PC version is the definition of rubbish.

Players assume the role of Isaak Clarke, an engineer aboard the USG Kellion, a long-range craft dispatched to respond to a distress signal sent out by the USG Ishimura. A malfunction while docking leaves players stranded on what appears to be an abandoned Ishimura. Survival horror and some cheap but effective round-the-corner scares ensue. Gameplay is very linear as players find their way through gritty spacecraft corridors and rooms, completing tasks to reinstate power, protecting the ship from an asteroid shower, and uncovering the mystery of the crew's disappearance. Oh, and looting everything in sight as apparently it's OK to steal money and supplies while on a rescue mission. A trusty laser-cutter is the weapon of choice, and as is common in many games, others become available, but the original is the most effective against the grotesque deformations currently calling the Ishimura home. The controls on the 360 are pretty tight (unfortunately game-breaking on the PC), so combat and movement feels quite responsive and natural, even in the areas of the ship without gravity. A decent outing overall, as long as you don't play it on the PC.

AVAILABLE PLATFORMS: ~~PC-DVD~~ ~~Wii~~ ~~PS 3~~ XBOX 360

CONTACT EA
ONLINE www.deadspace.ea.com
PRICE $99.95

✔ Decent storyline; anti-gravity combat it neat; unique levels.

✖ Difficulty can spike; certain levels are stumbling blocks.

VERDICT - PC ★★☆☆☆
VERDICT - XBOX360 ★★★★☆

Toprate

You've gotta try...

HALO WARS

An RTS? Really? We headed over to Microsoft HQ to check out the latest Spartan offering and were pleasantly surprised that it's, well, actually quite good. The undisputed kings of the RTS, Ensemble studios got on board to offer players a single and multiplayer experience. HALO Wars takes place long before Master Chief became arrogant about being the last of his kind. The single-player levels have a nice mix of style. Some are the classic RTS makeup of collecting supplies to build bases and an army before the enemy builds his. While in other levels, players begin with a small force or a tank and need to destroy/infiltrate/extract (x) objective. The multiplayer is a lot of fun and will keep the punters coming back for more. There's many versus modes to choose from, and the only pitfall we predict is that the 360 controls may prove too simplistic for seasoned RTS players: managing, selecting and moving units individually can be tough.





AVAILABLE PLATFORMS

PC-DVD | ~~Xbox 360~~ | ~~PS3~~

~~Wii~~ | ~~Xbox LIVE~~ | ~~PSN~~

CONTACT Turbine

ONLINE www.lotro.com

PRICE $49.95 plus subscription

✔ Plenty of new content; Warden class is exciting.

✖ End-game instances are far too much of a grind.

VERDICT ★★★★½

LOTRO: The Mines of Moria

Troy Coleman gets greedy and delves too deeply into the mines: only finds Hobbits.

A little over eighteen months and seven free content updates later, Turbine has launched its first (of many planned) expansions, which open up three new areas for players: The Mines of Moria, Eregion and a small portion of Lorien. The Mines themselves are a vast maze of twisting tunnels and caverns, carved literally from the stone around them. It's easy to get lost trying to navigate the deep dark; but the zone looks so great that the forced 'exploration' is often welcome. As well as raising the previous level cap from 50 to 60, Turbine has rolled out two new classes for MoM: The Runekeeper — a light-armour-wearing DPS/Healer and the closet thing to a magic-user as Turbine could go without straying from the LOTR Lore — and the Warden — a medium-armour-wearing DPS/Off-tank and master of the spear. The introduction of the new classes also serves to keep the beginner zones populated while people level them up.

Legendary weapons and items (weapons of great renown akin to Glamdring and Sting) have been introduced for all classes. These items earn XP and level up alongside players and can have Diablo-style relics and gems slotted into them to make them even more powerful.

A new twelve-person raid (which is sadly and literally a one -room, one-boss fight) and six new six-man instances are spread throughout the zones, with the six-man's do-able in easy or hard mode. Hard modes are a player's key to end-game armour and, as such, seem like an endless grind — as everyone runs through time and again in the hope of winning the single loot roll.

KillZone 2

Christopher Zammit grabs a gun and starts swearing!

KillZone 2 has been in development since just after the original game was released. Guerilla Games has put a lot of work into it, and by god does it show!

From beginning to end, the dark, grungy environments of the Helghan homeworld create a foreboding, almost depressing feel for the player.

A strong cinematic feel saturates the highly emotive game scenarios, making KZ2 a deeply immersive experience.

As good as it is in the looks department, KillZone 2 suffers from an inevitable lack of originality as far as the gameplay goes. The same old scenarios with the same old weapons make you feel like you've done all this before. That doesn't make it bad... just not great.

Although KillZone 2 will never be touted as the greatest shooter ever, it does take the FPS formula and tweaks it to near-perfection. The novel use of the Sixaxis controller for tasks such as laying mines and opening doors is a nice touch. Combat physics and good bot AI keeps KZ2 fresh.

Online is where KillZone 2 really shines with a great Warzone mode that gives it an original feel. Great visuals, realistic sounds, challenging gameplay and the odd splattering of expletives makes this a must-have game for all mature-aged gamers!

AVAILABLE PLATFORMS

~~PC-DVD~~ | ~~Xbox 360~~ | PS 3

~~Wii~~ | ~~Xbox LIVE~~ | ~~PSN~~

CONTACT Sony

ONLINE www.au.playstation.com

PRICE $109.95

✔ A good shooter with great graphics and gameplay.

✖ Some cheesy dialogue.

VERDICT ★★★★½





chipchat

BY PETER DOCKRILL

Going, going... gone?



Now here's an interesting way to make a few extra bucks. American university student Natalie Dylan is auctioning her virginity online in a bid to fund her continuing studies in marriage and family therapy. After the 22-year-old's entrepreneurial venture was rejected by eBay, Dylan approached a Nevada brothel, the 'Moonlite Bunny Ranch', to oversee the auction and broker the deal on her behalf. At time of writing, Dylan's virginity has been the object of over 10,000 bids, with the current top being a not-inconsiderable US$3.8 million. (Pocket change for the super-wealthy/lonely/creepy perhaps?) Controversy over the auction has turned Dylan, who holds a bachelor degree in women's studies, into an instant celebrity in the US; she has been variously applauded and attacked in the blogosphere, while some are simply deriding the stunt as a sheer publicity exercise. Dylan herself has said: "I wanted to study the public's response. Now it seems that the tables have turned, and the public is studying me." But perhaps the best quip belongs to US writer Liz Langley, who advises: "First off, let's make sure some religious group doesn't buy it and decide to keep it intact forever."



Road rage

Road safety signs are no laughing matter — but what if they're taken over by mischievous hackers? That's what happened in Austin, Texas, when two road construction signs near the University of Texas were co-opted by hackers and rendered to display the zombie alert you see on the left. Local authorities were not amused, however, with Austin Public Works spokesperson Sara Hartley calling the prank "really serious" and indicating that hacking the signs this way constituted a crime (a class C misdemeanour, per Texas law). Not to mention that it trivialises the occurrence of *actual* zombie attacks.

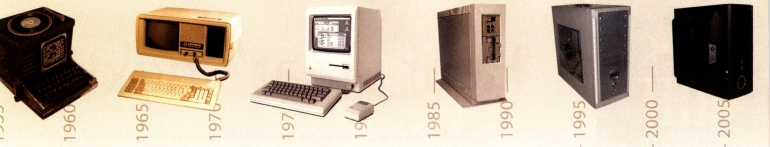


Where there's smoke

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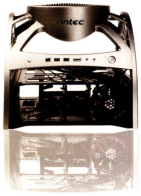
You've really got to hand it to Google: its AdWords scheme is genius. Think about it. When people use Google, they're already looking for things; they're in a 'hunting and gathering' frame of mind by default. So to put a column of targeted, context-specific advertisements just off to the side of their actual search results is a masterstroke. Mix that with some creative thinking on the part of their advertisers and you've got a match made in click-fetching money-making heaven. And sure: sometimes the results can get a little bit far-fetched. As in, if you're searching for the Victorian Bushfire Appeal, you're *probably* not primarily looking for the Trading Post (in order to hawk off your old crap to drum up some cash so you can afford to donate those much-needed funds in the first place hooray). But *maybe* you are. BTTC

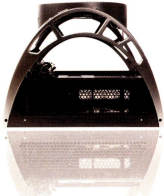


Computer Case Design



Skeleton





Okay, so we skipped a few generations.

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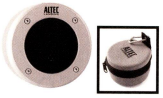


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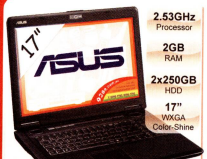
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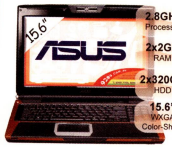
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- Vista Home Premium

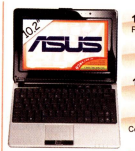


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2x2GB RAM
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- XP HOME



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$659

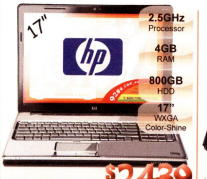
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- 1.6GHZ
- BLACK,
- 10"
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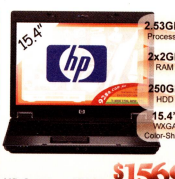


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17" WXGA Color-Shine

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- 5,000:1 Dynamic Contrast Ratio, Glossy Black



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Acer V223WB $259

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- 300cd/m2 Brightness, Black,
- 2ms, 10,000:1 Dynamic Contrast



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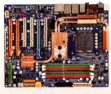
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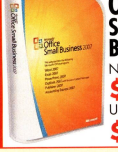
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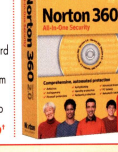


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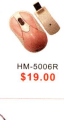


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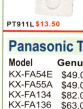
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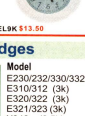
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FO-3CR	$ 31.00	$ 16.00
FO-6CR	$ 24.00	$ 18.00
FO-9CR	$ 30.00	$ 18.00
FO-15CR	$ 44.00	$ 21.00

Epson Toner Cartridges

Model	Genuine	TONNY
EPL-5700/5800	$196.00	$ 49.00
EPL-5900/6100	$213.00	$ 49.00
EPL-6200	$163.00	$ 49.00
AL-C900/1900BK	$102.00	$ 65.00
AL-C900/1900C/M/Y	$220.00	$ 65.00
AL-CX11N/C1100BK	$107.00	$ 49.00
AL-CX11N/C1100C/M/Y	$164.90	$ 49.00
AL-C1000/2000BK	$124.00	$105.00
AL-C1000/2000C/M/Y	$249.00	$115.00

Panasonic Thermal Film

Model	Genuine	TONNY
KX-FA54E	$49.00	$18 Twin Pack
KX-FA55A	$49.00	$19 Twin Pack
KX-FA134	$82.00	$35 Twin Pack
KX-FA136	$63.00	$26 Twin Pack

Lexmark Toner Cartridges

Model	Genuine	TONNY
Optra E/E+	$ 142.00	$ 59.00
E120 prebate	$ 110.00	$ 55.00
E210	$ 152.00	$ 49.00
X215	$ 112.00	$ 49.00
E220 prebate	$ 129.00	$ 79.00

Model	Genuine	TONNY
E230/232/330/332	$ 122.00	$ 55.00
E310/312 (3k)	$ 176.00	$ 73.00
E320/322 (3k)	$ 155.00	$ 82.00
E321/323 (3k)	$ 155.00	$ 85.00
X342n (2.5k)	$ 137.00	$ 69.00

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- 20 sheets

A6 (105x148mm)...$ 4.70 TPP2846
A4 (210x297mm)...$13.90 TPP2811

Epson Ink Cartridges

Model	Genuine	TONNY
T028	$43.60	$ 4.40
T029	$39.10	$ 4.90
T038	$20.00	$ 5.00
T039	$28.40	$ 5.60
T0461	$22.00	$ 4.50
T0472/3/4	$14.90	$ 4.50
T0491/2/3	$21.00	$ 4.50
T0494/5/6	$21.00	$ 4.50
T0621	$22.00	$ 5.20
T0631	$16.00	$ 5.20
T0632/3/4	$15.20	$ 5.20
73N BK (T0731)	$17.00	$ 7.40
73N C/M/Y (T0732/3/4)	$17.00	$ 7.40
81N BK (T0811)	$27.00	$ 8.40
81N C/M/Y (T0812/3/4/5/6)	$27.00	$ 8.40
S020089 / T052	$35.10	$ 4.80
S020093/ T050	$29.00	$ 4.80
S020187/T050	$28.00	$ 4.80
S020189/ T051	$32.00	$ 4.80
S020191 / T052	$34.00	$ 4.80

Canon Ink Cartridges

Model	Genuine	TONNY
BX-3	$47.00	$23.10
BC-05	$59.60	$26.70
BC-20	$62.00	$24.00
PG-40	$34.00	$24.00
CL-41	$35.00	$24.50
BCI-3eBK	$22.70	$ 6.40
BCI-3eC/M/Y	$20.40	$ 5.70
BCI-6BK	$24.10	$ 5.70
BCI-6C/M/Y	$24.10	$ 5.70
BCI-6PC/PM	$24.10	$ 5.70
BCI-6G/R	$24.10	$ 5.70
CLI-8BK with chip	$22.50	$ 9.80
CLI-8C/M/Y with chip	$22.50	$ 9.80
PGI-5BK with chip	$22.50	$ 9.80
CLI-8BK no chip	-	$ 5.70
CLI-8C/M/Y no chip	-	$ 5.70
CLI-8PC/PM no chip	-	$ 5.70
PGI-5BK no chip	-	$ 5.70
BCI-15BK	$24.90	$ 6.10
BCI-16C	$40.70	$ 6.30
PG-510	$24.10	-
CL-511	$27.40	-
PGI520BK	$19.30	-
CLI521BK/C/M/Y	$19.30	-
BCI-24BK	$15.30	$ 5.60
BCI-24C	$31.00	$ 6.90

Rated 9 out of 10 by PC User

Lexmark Ink Cartridges

Model	Genuine	TONNY
18C0781A (#1)	$36.90	$24.60
10N0016 (#16)	$49.30	$18.40
15M0120 (#20)	$63.60	$24.00
10N0026 (#26)	$53.00	$23.00
18C0032 (#32)	$36.90	$21.30
18C0033 (#33)	$39.80	$23.10
18C0034 (#34)	$41.60	$25.00
18C0035 (#35)	$49.30	$27.00
12A1970 (#70)	$55.90	$21.00
18L0032 (#82)	$60.20	$26.10
18L0042(#83)	$62.60	$23.90

Brother Ink Cartridges



Model	Genuine	TONNY
LC-37BK	$25.20	$ 5.00
LC-37C/M/Y	$16.60	$ 6.50
LC-38BK	$24.50	$ 5.00
LC-38C/M/Y	$15.90	$ 6.50
LC-47BK	$34.60	$ 5.00
LC-47C/M/Y	$20.80	$ 6.50
LC-57BK	$34.50	$ 5.00
LC-57C/M/Y	$20.80	$ 6.50

HP Ink Cartridges

Model	Genuine	TONNY
C8721WA (#02BK)	$28.20	$11.00
C8771/2/3/4/5WA (#02C/M/Y/LC/LM)	$16.60	$ 8.20
C6615DA(#15)	$42.40	$14.10
C9351AA (#21)	$24.00	$16.00
C9352AA (#22)	$27.30	$21.00
C8727AA(#27)	$28.90	$14.10
C8728AA (#28)	$33.00	$22.00
51645AA (#45)	$44.70	$16.00
C6656AA (#56)	$30.60	$15.20
C6657AA (#57)	$48.90	$23.00
C6656AA (#58)	$38.80	$23.00
CB336WA(#74XL)	$44.80	$29.50
CB338WA (#75XL)	$49.80	$30.00
C6578DA (#78)	$48.80	$19.90
C9396A (#88 BK)	$49.60	$21.30
C9391/2/3A(#88C/M/Y)	$36.40	$14.70
C9362WA (#92)	$23.20	$14.70
C9361WA(#93)	$30.00	$16.90
C8765WA(#94)	$31.30	$16.90
C8766WA(#95)	$36.40	$20.00
C8767WA (#96)	$44.80	$18.10
C9363WA(#97)	$50.20	$15.80
C9364WA (#98)	$26.40	$15.80
C9369WA (#99)	$37.80	$26.20

HP Toner Cartridges

Model	Genuine	TONNY
Q2610A	$ 183.00	$55.00
Q6511X	$ 316.00	$79.00
Q2612A	$ 106.00	$45.00
Q2613A	$ 109.00	$45.00
C7115A	$ 95.00	$45.00
Q7516A	$ 276.00	$105.00
C4127X	$ 194.00	$59.00
CB435A	$ 95.00	$54.00
CB436A	$ 107.00	$54.00
Q1338A	$ 235.00	$85.00
Q5942A	$ 226.00	$95.00
Q5942X	$ 343.00	$105.00
Q5949A	$ 109.00	$49.00
Q5949X	$ 201.00	$55.00
Q7551X	$ 330.00	$76.00
Q7553A	$ 123.00	$55.00
Q7553X	$ 227.00	$59.00
CB061X	$ 194.00	$59.00
C4092A	$ 90.00	$45.00
C4096A	$ 153.00	$59.00

HP Color Toner

Model	Genuine	TONNY
CB540A	$109.00	$81.00
CB541/2/3A	$ 99.00	$81.00
Q6000A	$116.00	$78.00
Q6001/2/3A	$126.00	$159.00
C9730A	$339.00	$159.00
C9731/2/3A	$469.00	$159.00

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Brother Toner Cartridges

Model	Genuine	TONNY
TN-2025	$ 81.20	$ 49.00
DR-2025	$ 149.20	$ 62.00
TN-2150	$ 85.00	$ 49.00
DR-2150	$ 147.00	-
TN-3060	$ 117.00	$ 49.00
TN-3185	$ 123.00	$ 49.00
TN-6600	$ 110.90	$ 49.00
TN-7600	$ 115.00	$ 49.00
TN-8000	$ 47.00	$ 19.00
TN-04BK	$ 243.00	$ 99.00
TN-04C/C/Y	$ 243.00	$ 99.00
TN-12BK	$ 129.00	$ 72.00
TN-12C/M/Y	$ 263.00	$ 105.00
TN-150/155 BK	$ 81.00	-
TN-150/155 C/M/Y	$ 97.00	-

Samsung Laser Toner

Model	Genuine	TONNY
SCX-4100D3	$110.00	$49.00
SCX-4216D3	$110.00	$49.00
SCX-D4200A	$110.00	$49.00
SCX-4521D3	$116.00	$49.00
SCX-D4725A	$110.00	$64.00
SCX-5312D6	$ 86.00	$70.00
SF-5100D3	$110.00	$49.00
ML-1210D3	$110.00	$49.00
ML-1610D2	$104.00	$49.00
MLT-D108S	$ 85.00	-
MLT-D109L	$137.00	-
ML-1710D3	$110.00	$49.00
ML-2010D3	$103.00	$49.00
ML-2150D8	$204.00	$82.00
ML-2250D5	$134.00	$59.00
ML-D3050B 8k	$263.00	$86.00

Canon Toner Cartridges

Model	Genuine	TONNY
CART 303(Q2612A)	$ 89.00	$45.00
CART 308(Q5949A)	$ 89.00	$49.00
CART 310 II(Q6511X)	$ 264.00	$79.00
CART 312	$ 81.00	-
EP-22 (C4092A)	$ 75.00	$45.00
EP-26	$ 99.00	$45.00
CART307BK(Q6000A)	$ 99.00	$78.00
CART307C/M/Y(Q6001/2/3A)	$105.00	$78.00
CART 301 BK (EP87 BK)	$125.00	$77.00
CART 301 C/M/Y (EP87CMY)	$140.00	$77.00
CART311BK	$155.00	-
CART311C/M/Y	$199.00	-
FX-3	$ 99.00	$45.00
FX-7	$139.00	$65.00
FX-9	$120.00	$49.00
CARTN	$231.00	$59.00
CARTU	$105.00	$45.00
CARTW	$149.00	$53.00
E-31	$195.00	$55.00

Kyocera Toner Cartridges

Model	Genuine	TONNY
TK-16H	$ 73.00	$61.00
TK-17	$103.00	$35.00
TK-18	$123.00	$38.00
TK-310	$130.00	$59.00
TK-510K	$ 98.00	-
TK-510C/M/Y	$172.00	-

Panasonic Toner Cartridges

Model	Genuine	TONNY
UG-3313	$242.00	$73.00
UG-5545	$242.00	-
KX-PDP8 Toner for KXP7100/7110	$136.00	$68.00

Samsung Color Laser Toner

Model	Genuine	TONNY
CLP-300A BK	$ 86.00	$36.00
CLP-300A C/M/Y	$ 78.00	$35.00
CLT-409S BK for CLP-310/315,CLX-3170/3175	$ 70.00	-
CLT-409S C/M/Y for CLP-310/315,CLX-3170/3175	$ 61.00	-
CLP-510D7 BK	$145.00	$92.00
CLP-510D5 C/M/Y	$160.00	$92.00
CLP-600A BK	$121.00	$123.00
CLP-600A C/M/Y	$172.00	$126.00

Konica Minolta Color Laser Toner

Model	Genuine	TONNY
QMS Magicolor 2300/2350 BK	$121.00	$69.00
QMS Magicolor 2300/2350 C/M/Y	$161.00	$69.00
QMS Magicolor 2400W/2430DL/2450 BK	$119.00	$85.00
QMS Magicolor 2400W/2430DL/2450 C/M/Y	$164.00	$85.00

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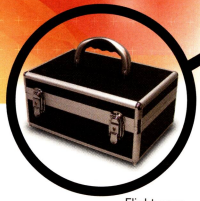
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5 x Comp Canon PGI-5 & CLI-8 with chips	=$45
2 sets Compatible Epson T731-T0734	=$48
1 set of Compatible Epson T0491-T0496	=$33
12 x Comp Canon BCI-3 & 6 your choice	=$45

Brother :

	Original	Comp
TN-2025	$89	$48
TN-2150	$80	$66
TN-3060/TN-3185	$132	$58
TN-4100	$156	N/A
TN-6600 High	$127	$58
TN-7600 High	$131	$58
TN-8000	$59	$20
LC-67 Bk/CMY	$39/$22	$8
LC-47 Bk/CMY	$40/$24	$6

	Original	Comp
DR-2025	$161	$96
DR-2125	$160	N/A
DR-3000/3115	$218/$236	$85
DR-4000 Drum	$199	$85
DR-6000 Drum	$220	$85
DR-7000 Dun	$220	$85
DR-8000 Drum	$249	$95
LC-57/LC-37	$40/$24	$6
LC-38 Bk/CMY	$28/$20	$6

HP :

	Original	Comp
HP-Q1338A	$237	$95
HP-Q2612A	$124	$48
HP-C3906A	$121	$50
HP-C4092A	$102	$50
HP-C4096A	$165	$58
HP-C4127X	$200	$75
HP-C4129X	$251	$90
HP-C4182X	$293	$90
HP-CB435A (35A)	$84	$66
HP-CB436A (36A)	$99	$69
HP-Q5942X	$339	$110
HP-Q5949X	$203	$60
HP-Q6511X	$317	$85
HP-C7115X	$132	$48
HP-C8061X	$200	$65
HP Q7516A	$284	$100
HP-92274A	N/A	$55
HP Q7551X	$329	$75

	Original	Comp
HP-02 Bk/CMY	$31/$21	$8
HP-10&11 B/CMY	$52/$58	$13
HP-21&22 Combo	$46	N/A
HP-40 Bk/CMY	$50/$53	N/A
HP-45 51645A	$49	$24
HP-56 C6656A	$37	$24
HP-57 C6657A	$53	$26
HP-60 Bk/Col	$27/$31	N/A
HP-74 & 75	$27/$30	N/A
HP-78 C6578)	$53	$30
HP-88 (CMYK)	$53/$42	$13
HP-94 & 95	$37/$42	N/A
HP-96 C8767WA	$49	$28
HP-97 C9363WA	$53	$32
HP-901-Bk	$28	N/A
HP-901-Colour	$42	N/A
HP-Q7553X	$231	$69
HP-92298X	$178	$60

HP Colour Laser :

C8540A-CB543A	$124/$117	N/A
Q3960A-Q3963A-2550	$145/$165	$86
Q6000A-Q6003A-2600	$130/$139	$88

Q6470A-Q6473A-3600	$211/$204	N/A
C9700A-Q9703A-2500	$140/$160	$86
C9720A-C9723A-4600	$239/$319	$104

Konica Minolta:

	Original	Comp
Pagepro 1300 (BK)	$115	N/A
Pagepro 1400W (Bk)	$81	N/A
Pagepro 9100N (Bk)	$285	N/A
QMS 2300(CMYK)	$153/$215	$76/$97
QMS 2400(CMYK)	$153/$217	$99

	Original	Comp
QMS 3300(CMYK)	$103/$285	N/A
QMS 5430(CMYK)	$181/$248	N/A
QMS 5440(CMYK)	$188/$258	N/A
QMS 6100(CMYK)	$370/$472	N/A
QMS 7300(CMYK)	$141/$212	N/A

Lexmark:

	Original	Comp
E120	$128	$60
E210	$168	$55
E220	$144	N/A
E230/330/332 (H.Yield)	$199	$65
E240	$128	N/A
E250	$164	$65
E310/E312 (H.Yield)	$309	$70

	Original	Comp
X215	$132	$55
T620	$349	$134
T630	$536	$134
C510(CMYK) High	$292/$419	$134
C720(CMYK)	$244/$354	N/A
Inkjet #16	$63	$22
Inkjet #26	$66	$24

Oki:

	Original	Comp
OKI-5100(CMYK)	$99/$223	$65/$86
OKI-5250(CMYK)	$99/$223	$65/$86

	Original	Comp
OKI-9300(CMYK)	$217/$460	N/A
OKI-9600(CMYK)	$179/$458	N/A

Xerox:

	Original	Comp
P8EX	$169	$81
PE-220	$132	$60
203A/204A	$83	$50
DocuCentre 240A	$211	N/A

	Original	Comp
DocuPrint 340A	$211	N/A
WorkCentre C2424	$166	N/A
Phaser C525	$133/$203	$65
Phaser 8200	$293/$297	N/A

Canon :

	Original	Comp
Cart-303/Q2612A	$96	$48
Cart-308 II/Q5949X	$169	$60
Cart-309/Q7516A	$248	$100
Cart-310 II/Q6511X	$278	$85
Cart N	$236	N/A
Cart-U/EP-26	$118/$119	$50
Cart-W	$162	$50
E-31	$197	$55
FX3	$121	$45
FX-9	$134	$50
EP-22/ C4092A	$86	$50
BCI -21/24 BK	N/A	$4.5
BCI -3eBK/6Bk/C/M/Y	N/A	$4.5
PGI-5Bk/CLI-8 W/Chip	$27	$10

	Original	Comp
EP-25/C7115X	$85	$48
EP-32/C4096A	$150	$58
EPA/C3906A	N/A	$50
EPP/92274A	N/A	$55
EPE/92298X	N/A	$60
NP-52/C4127X	$192	$75
EP-87 (CMYK)	$123/$141	$86
Cart-301 (CMYK)	$137/$153	$86
Cart-307 (CMYK)	$104/$119	$88
Cart-311 (CMYK)	$164/$200	N/A
Cart-316 (CMYK)	$85/$78	N/A
PG-40/CL-41	$40/$43	N/A
PG-510/CL-511	$28/$42	N/A
PGI-520Bk/CLI-521	$22	N/A

Canon Chip Resetter For PGI-5 & CLI-8 $45

Epson:

	Original	Comp
EPL-5900/6100	$223	$60
Drum EPL-5900	$170	$80
T0811-T0816	$29	$ 7
T0751-T0754	$16	$ 7
T0731-T0734	$18(73N)	$ 7
T0621/T0631-T0634	$25/$19	$ 6
T0561-T0564	$20	$ 6
T5591-T5596	$24	$ 6
T0491-T0496	$23	$ 6

	Original	Comp
EPL-6200	$174	$60
Epson C1100	$127/$173	$65
T0461-T0474	$24/$19	$6
T0321-T0424	$58/$25	$6
T038/T039	$22/$30	$5/$7
T028/T029	$58/$45	$5/$7
T026/T027	$42/$38	$5/$7
T007/008/T009	$32/$30/$44	$5/$7
T050/T051/T052/53	N/A	$5/$7

Kyocera:

	Original	Comp
TK-17	$121	$ 45
TK-18	$142	$45
TK-50H	$166	$75
TK-55	$171	$65
TK-60	$137	$69

	Original	Comp
TK-110	$139	$60
FS-5016(CMYK)	$123/$219	N/A
FS-5020(CMYK)	$117/$182	N/A
FS-C8008(CMYK)	$194/$203	N/A
FS-C8026(CMYK)	$211/$330	N/A

Samsung :

	Original	Comp
ML-1210D3	$142	$ 55
ML-1610D/2010D	$126	$ 55
ML-1650	$234	$ 99
ML-1710D/SCX-4216	$131	$ 55
ML-2250	$168	$ 65
ML-3050	$299	$104
ML-3560	$194	N/A
ML-4500D	$144	$ 55
ML-5200	N/A	$ 85
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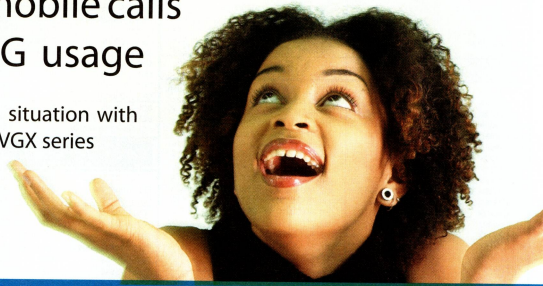
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Cyan T1122	EPA2292	$17
Magenta T1123	EPA2392	$17
Yellow T1124	EPA2492	$17



Samsung ML-2851ND Mono Laser Printer

Mono network printer with duplex

- Up to 28ppm mono
- Duplex printing
- USB, Ethernet
- 2 year onsite warranty

WebCode: SAM2851

Black ML-2851N	SAM6359	$200



Samsung CLP-610ND Colour Laser

Efficient and sharp detail

- 20ppm Colour
- 2400x600 dpi printing
- Built-in Duplexer
- USB, Ethernet

WebCode: SAM0610

5K Black K660B	SAM6361	$168
Cyan C660B	SAM6362	$223
Magenta M660B	SAM6363	$223
Yellow Y660B	SAM6364	$223



Samsung SCX-4828FN Mono Multifuntion

Ideal for all your business needs

- Print, Scan, Copy, Fax
- 28ppm Mono
- Built-in Duplexer
- USB, Ethernet

WebCode: SAM4828

Black MLT-D209L	SAM6572	$150



Canon PIXMA iP4600

Outstanding, vibrant photos and documents at home

- Up to 21ppm Colour
- 9600x2400 Dpi
- CD & DVD Printing
- USB 2.0

WebCode: CNN0009

Black CLI-521	CAN7000	$18
Cyan CLI-521C	CAN7003	$18
Magenta CLI-521M	CAN7002	$18
Yellow CLI-521Y	CAN7001	$18



HP LaserJet P2015dn Mono Laser

Produce quality documents at 1200 dpi

- 26ppm Mono, Duplex
- 1200x1200 dpi
- PCL 5E, PostScript 3, PCL 6
- USB, Ethernet

WebCode: HPL0368

3K Black 53A	HPL7553	$140
5K Black 53X	HPL7554	$258



Fuji Xerox DocuPrint C2200 A4 Colour Laser

A colour laser with all the right features

- 25ppm Colour & Mono
- 600 x 600 DPI
- USB 2.0, Ethernet
- Mac & PC Compatible
- Memory 256MB

WebCode: FXP2201

6K Black	FXP2208	$235
4K Cyan	FXP2209	$240
4K Magenta	FXP2210	$240
4K Yellow	FXP2211	$240



Samsung CLX-6210FX Colour Multifunction

Cost effective colour printing

- 20 ppm colour & mono
- Duplex / Copy / Scan / Print / Fax
- USB or Ethernet connection
- 1 Year onsite warranty

WebCode: SAM6210

5K Black K660B	SAM6361	$168
Cyan C660B	SAM6362	$223
Magenta M660B	SAM6363	$223
Yellow Y660B	SAM6364	$223

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Shintaro Hard Drive Docker

Dock your hard drive and Go!

- 2.5/3.5" SATA HDD dock to USB
- Transfer up to 60MB/sec
- Supports - Win 98, ME, 2000, XP, VISTA and MAC OS X, MAC OS 9.

WebCode: SHI0032



$170 Save $19

Seagate FreeAgent Go 320GB Silver

Take all your photos, music & videos everywhere.

Automatic backup software helps you easily protect your data.

WebCode: SGA4003



$129 Save $50

Verbatim 250GB 2.5" Premium Edition Portable Hard Drive

Palm-sized and light weight making it easy to carry with you.

Transfer documents & data easily between home and office

WebCode: VBM9551



$355 Save $44

FREE DELIVERY

D-Link DNS-323 2-Bay Network Storage Enclosure

Secure and share your digital files

Enables you to share documents, files, and digital media such as music, photos, and video with everyone on the home or office network.

WebCode: DLK0066

Seagate 500GB FreeAgent Desk

Easily protect your data with automatic backup software

The FreeAgent Desk storage solution includes easy-to-use software that helps keep your information safe and private with automatic backup and encryption of your important files and folders. Environmentally smart, sleep mode enables once it has been idle for 15 minutes.



$169 Save $33

WebCode: SGA4104

LaCie Network Space - Ethernet Central Storage - 1TE

Store your files on your network

Centralize all of your files and share them among networked PC/Mac computers or UPnP AV certified players. Transfer and back up files from your computers easily, and connect a hard disk or digital camera through the extra USB port for directly storing your data or pictures. No setup is required; just connect the LaCie Network Space to your network and enjoy using it immediately.

Available Mid March



$259.95 Save $89

FREE DELIVERY

WebCode: LAC1000



Verbatim Storage Media

CD-R x 10 Jewel Case	VBM1846	$9
CD-R x 30	VBM4934	$17
CD-R x 50 Inkjet	VBM5005	$19
CD-R x 50	VBM4961	$16
CD-R x 100 Inkjet	VBM5252	$36
CD-R x 100	VBM4554	$30
DVD-R x 25	VBM0580	$16
DVD-R x 50	VBM5101	$23
DVD-R x 50 Inkjet	VBM1973	$24
DVD-R x 100	VBM6049	$44
DVD-R x 100 Inkjet	VBM5153	$47
DVD+R x 25	VBM5033	$16
DVD+R x 50	VBM5037	$23
DVD+R x 50 Inkjet	VBM1974	$25
DVD+R x 100	VBM6050	$43
DVD+R x 100 Inkjet	VBM1995	$47
DVD+R DL 8.5Gb 1Pk	VBM4912	$4
DVD+R DL 8.5Gb 3Pk	VBM5014	$12
DVD+R DL 8.5Gb x 20	VBM4981	$52
BD-R 2x 25GB 5Pk	VBM4361	$81
BD-R 2x 25GB 10Pk	VBM6068	$168



SanDisk Cruzer Micro U3 8GB

The market leading flash drive

The Cruzer Micro design is a small, smart and secure USB Flash Drive.

2GB	SAN0061	$14
4GB	SAN0062	$22
8GB	SAN0103	$36
16GB	SAN0164	$58



Kingston DT100 USB Drive

For the budget conscious user

With simplicity in mind, The USB connector is safely housed inside the case, never having to worry about losing a cap.

2GB Black	KNM2629	$14
2GB Blue	KNM2652	$14
2GB Red	KNM2651	$14
4GB Black	KNM2636	$19
8GB Black	KNM2631	$35
16GB Black	KNM2715	$62



$625 Save $244

Netgear RND2000 ReadyNAS Duo 1 x 500 GB

Keep all your Documents, Movies, and Pictures secure.

Storage that can be shared with all your computers, media centres, and gaming consoles.

WebCode: NTG8133



SanDisk Cruzer Titanium USB

The Strongest USB Drive Around

Cased in Titanium, and crush-resistant. Makes this drive practically indestructible.

1GB	SAN0068	$22
4GB	SAN0086	$25
8GB	SAN0127	$45
16GB	SAN0175	$74



Kingston DataTraveler 150 - USB Flash Drive

Big news in mobile storage

Budget conscious users can now break storage barriers, allowing them to easily store and move large files in a 32GB device no bigger than a pocketknife.

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64GB	KIN0038	$188



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Designed specifically for home office

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Nintendo Wii Console & Wii Sports

Fun for all, young and old

- Vertical Stand
- 1x Wii Remote
- 1x Wii Nunchuck
- 1x Wii Sports Game

WebCode: ALL5085

Family Tree Maker 2009 Platinum Edition

Learn more about your family.

Everything you'll ever need to trace your ancestors from Australia and beyond is included in Family Tree Maker 2009 – Australian Edition, because it integrates seamlessly with www.ancestry.com.au. Ancestry.com.au is the largest available database of Australian and New Zealand ancestors, and is part of Ancestry.com – the biggest genealogy database in the world. Family Tree Maker is the packed full of resources, so spending hours in the library under the microfiche is a thing of the past, it's all there at your fingertips.



WebCode: AVA1012



Dr Penny Adams Brain Trainer

Improve Memory, Increase Concentration and Enhance Logic

- Automatically generates new questions
- Train yourself

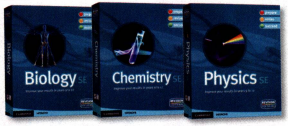
WebCode: IMS0048



Nintendo Wii Accessories

Dreamgear Wii Charging Dock
DGE0003 **$35**

Dreamgear Wii Soft Sports Kit
DGE0002 **$27**



Revision Software

Chemistry, Physics & Biology.... Prepare – Revise – Succeed!

These activities are designed to complement classroom work, are ideal for revision before exams and throughout the year, for Years 9 - 12

Revision Software: Biology	REV0001	**$58**
Revision Software: Chemistry	REV0002	**$58**
Revision Software: Physics	REV0003	**$58**



The Big Box of Languages

70 Languages in one!

- Comprehensive grammar references with alphabet overview
- Voice Recognition for Pronounciation
- Advanced speech analysis with a listen and speak feature
- Each with 7 fun interactive games

WebCode: MND1332



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Better Homes & Gardens Home Design

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Interior Designer 8.0	BHG0003	**$77**
Architectural Home Designer 8.0	BHG0004	**$156**



PrintShop 23 Deluxe

#1 desktop publishing software for over 23 years

- The complete and easy way to create impressive print projects
- Professional project templates
- Powerful design and layout tools
- One-click photo editing

WebCode: MND1253



Nintendo Wii Games

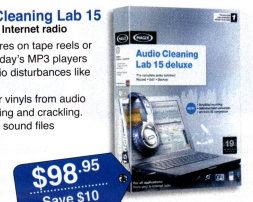
DeBlob	NIN0001	**$74.95**
LEGO Indiana Jones	ALL6007	**$74.95**
FIFA Soccer 09	ALL6013	**$74.95**
Mario Party 8	ALL6014	**$89.95**
Animal Crossing	NIN0003	**$89.95**
Nintendo Wii Music	ALL6009	**$89.95**

MAGIX Audio Cleaning Lab 15

From vinyl to Internet radio

Prepare your old treasures on tape reels or vinyl for a new life on today's MP3 players and free them from audio disturbances like hissing and crackling.

- Free your old tapes or vinyls from audio disturbances like hissing and crackling.
- Burn or refresh digital sound files



WebCode: MAG0008



MAGIX Photostory on CD & DVD 7

Great for burning photos to DVD and displaying on TV

- Fantastic camera movements and zooms
- Animations and music that fits any occasion

WebCode: MAG0009

Microsoft Office Home & Student 2007

Great for families, excellent for students.

Office Home and Student 2007 is the software suite that helps people easily create great-looking documents, worksheets and presentations, as well as manage notes and information at home. It offers improved menus and tools, enhanced graphics and formatting capabilities, new time management tools, and greater reliability and security.

Word 2007 | Excel 2007 | PowerPoint 2007 | OneNote 2007



$128 Save $81

Microsoft® Office

WebCode: MSA6101

SmartDraw 2009

Visual Productivity software to better organize, manage & communicate.

SmartDraw gives you the power to quickly create the business graphics you need to succeed, and is the perfect companion product to Microsoft Office.

- Bar graphs and pie charts
- Project timelines
- Mind Maps with integrated Gantt Charts
- Floor plans
- Sales territory maps
- Organisation charts
- Marketing strategy charts
- Forms, and more.



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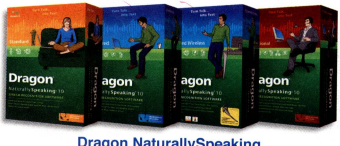
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Microsoft Office Suites

Create visually stunning documents, worksheets & presentations.

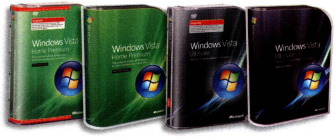
Office Outlook Academic	MSA6121	$82	SAVE $16
Small Business Upg 2007	MSA6106	$398	SAVE $41
Small Business 2007	MSA6105	$684	SAVE $100
Professional 2007	MSA6108	$804	SAVE $104



Dragon NaturallySpeaking

Voice Recognition, Speech-to-text software, perfect for dictation.

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Preferred 10	NUA0091	$259	SAVE $90
Preferred Wireless 10	NUA0105	$459	SAVE $140
Professional 10	NUA0097	$1273	SAVE $126



Windows Vista

Get started, with the smart & easy operating system.

Home Prem Edu Upg	MSA5120	$119	SAVE $20
Home Prem Upg SP1	MSA5119	$187	SAVE $12
Ultimate Upg SP1	MSA5124	$380	SAVE $19
Ultimate SP1	MSA5123	$432	SAVE $17



Document Management Solutions

PDF tools, scanning and OCR

Nuance PaperPort 11	NUA0009	$168	SAVE $31
Nuance OmniPage Pro 16	NUA0046	$849	SAVE $150
Nuance PDF Create 5	NUA0062	$57	SAVE $12
Nuance PDF Converter Pro 5	NUA0064	$159	SAVE $36



$475 Save $98

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Adobe Acrobat 9 Pro Windows

Protect documents with PDF

Communicate and collaborate more effectively and securely with virtually anyone, anywhere.

WebCode: ALD9649



$1125 Save $208

FREE DELIVERY

Adobe Acrobat 9 Pro Extended Windows

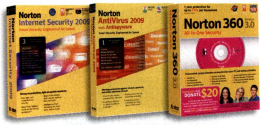
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Protection for ALL Users!

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Norton Internet Security 2009 3 User	SYM9956	$79
Norton Internet Security 2009 5 User	SYM9958	$210
Norton 360 3.0 3 User	SYM8800	$109



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BullGuard Antivirus & Security
Fast, Powerful and easy to use to use security suites.

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BullGuard Internet Security Gamer Edition	BUL0008	$58
BullGuard Mobile Antivirus	BUL0005	$49

Kaspersky Internet Security 2009 - 3 User
Proven Anti-Virus Protection

Kaspersky Internet Security 2009 provides you with the same proven anti-virus protection as Kaspersky Anti-Virus together with additional features including Parental Control, a personal firewall, an anti-spam filter, Privacy Control and more.



$79 Save $29

WebCode: KAS0004



$25 Save $4

BAK2u
Anti-Theft Software for PDA Phones & Blackberry

BAK2u is an innovative solution to help you recover your stolen Mobile device and identify the thief quickly and easily.

WebCode: BAK2000



$33 Save $6

Vipre Antivirus & Spyware
High performance protection that isn't a resource hog

Antivirus, antispyware, anti-rootkit and other security technologies into a seamless, tightly-integrated security solution

WebCode: VIP1000

AVG Internet Security 8.0 - 3 User
The Ultimate Security Solution

Anti-Virus, Anti-Spyware, Anti-Spam, Firewall and LinkScanner. Identifies and stops threats before they become a problem.

- Real-time protection against all Internet threats
- Real-time security while you surf, search and chat online
- Stops junk e-mail and spam based identity theft attacks



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5 Users (AVG0007) **$145**
10 Users (AVG0008) **$250**

WebCode: AVG0009



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AVG Anti-Virus Network Edition 8.0 - 5 PCs
Centrally controlled Anti-Virus protection

10 PCs (AVG0012) **$380**
20 PCs (AVG0013) **$660**

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Acronis True Image Home 2009 for Windows
Backup and recovery that is EASY to perform!

Make reserve copies of your backups and save them on the network drive or a USB storage device.

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Norton Utilities 14
Optimise your PC, for speed!

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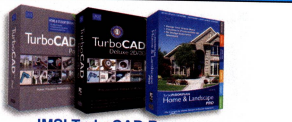
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Design Standard & Design Premium

Design Standard Win - Student	ADS0028	$375	SAVE $24
Design Standard Win - Academic	AEP0074	$729	SAVE $122
Design Standard Win	ALD1209	$2,336	SAVE $489
Design Premium Win - Student	ADS0025	$522	SAVE $63
Design Premium Win - Academic	AEP0072	$943	SAVE $191
Design Premium Win	ALD1207	$3,051	SAVE $579



IMSI TurboCAD Range
Create presentation-ready home plans

IMSI TurboCAD gives you unlimited design options with hundreds of professional drafting and design tools. Incredible flexibility, low learning curve and overall ease of use are hallmarks of this award-winning program

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IMSI TurboCAD 15 Deluxe	IMS0043	$185
Home & Landscape Pro	MND1334	$107



Adobe Creative Suite 4
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Web Standard Win - Student	ADS0035	$309	SAVE $40
Web Standard Win - Academic	AEP0087	$639	SAVE $119
Web Standard Win	ALD1217	$1,689	SAVE $330
Web Premium Win - Student	ADS0033	$461	SAVE $138
Web Premium Win - Academic	AEP0085	$876	SAVE $164
Web Premium Win	ALD1215	$2,897	SAVE $532

AutoCAD LT 2009
The world's best selling 2D drafting and detailing tool

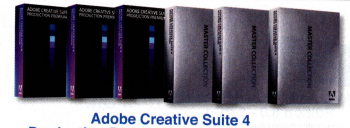
AutoCAD LT software simplifies daily tasks with full DWG native file format compatibility, the new ribbon interface, menu browser, and enhanced layer dialog.

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- Quick Properties – View key property information at the entity
- Quick View – thumbnail images of open drawings & layouts



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WebCode: AUT0193



Adobe Creative Suite 4
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Production Premium Win - Academic	AEP0078	$957	SAVE $178
Production Premium Win	ALD1213	$2,897	SAVE $534
Master Collection Win - Student	ADS0024	$894	SAVE $105
Master Collection Win - Academic	AEP0076	$1,587	SAVE $298
Master Collection Win	ALD1211	$4,196	SAVE $844

AutoCAD 2009
Professional 2D/3D industry standard CAD software

With AutoCAD software Autodesk has just one goal in mind: increasing your productivity. AutoCAD 2009 boosts efficiency with customisable and extensible user interface enhancements that increase overall drafting productivity by decreasing the number of steps to reach a command.

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Upgrade from 2006 (AUT0191) **$3,378**



WebCode: AUT0196



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WebCode: QUA0059



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Efficient and sharp detail

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WebCode: COR0420



*Student ID required

Wacom Intuos3 6 x 8 Tablet - Student*
For students at Uni or School

- Intuos3 is the industry standard graphics tablet for digital art, animation.

WebCode: WAC9983



Wacom Cintiq 12WX
The tablet that's a screen

- Easily rotate your display when working flat on your desktop to find the right position for your hand.

WebCode: WAC9977

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Adobe Premiere Elements 7	ALD0406	$146	SAVE $23
Adobe Photoshop Elements 7 & Adobe Premiere Elements 7	ALD0402	$225	SAVE $24
Adobe Photoshop Lightroom 2	ALD9662	$499	SAVE $79



COR9203 CRL0009

Corel Photo & Video Editing

Production quality editing software

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Photo & Video Bundle	$220	



Corel Painter 11

Corel Painter 11 is the ultimate art studio for anyone ready to expand their definition of creativity.

WebCode: COR8712



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The best that video editing has to offer

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Pinnacle Studio Ultimate 12	PIN0183	$210	SAVE $65
Sony Vegas Movie Studio Plat Pro 9	SON0091	$230	SAVE $59



Roxio Creator 2009

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WebCode: ROX5010



Nero 9

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The next generation of the world's most trusted integrated digital media and home entertainment software suite.

WebCode: NER0043



Kodak EasyShare M1073IS

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WebCode: KOD1073

Canon Powershot A2000IS

Great for everyday use

WebCode: CAN2023



Stash DV Z1 - Digital Video Camera

HD 1080P, 4:3 at 30 FPS

WebCode: STA1000

Olympus MJU Tough 8000

Dust proof / Waterproof / Shockproof

WebCode: OLY8000



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WebCode: SIG0008



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Memory Stick Pro Duo

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4GB (SAN0053) $34
8GB (SAN0120) $61



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4GB (SAN0066) $43



Extreme III SD

2GB (SAN0112) $25
4GB (SAN0125) $37
8GB (SAN0126) $65



Extreme III Compact Flash

2GB (SAN0106) $38
4GB (SAN0107) $55
8GB (SAN0108) $95



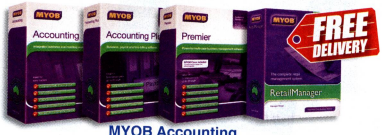
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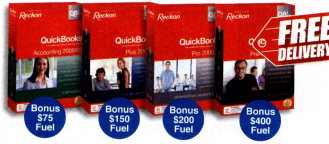
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MYOB Accounting

Built for Australians by Australians

MYOB Accounting 18	MYB0086	$258
Accounting Plus 18	MYB0087	$469
MYOB Premier 12	MYB0089	$1,278
RetailManager 10	MYB0082	$1,399



QuickBooks Accounting

The worlds best accounting software

QuickBooks Accounting 2008/09	QUI0151	$257
QuickBooks Plus 2008/09	QUI0152	$488
QuickBooks Pro 2008/09 + Bonus CRM	QUI0153	$729
QuickBooks Premier 2008/09 + Bonus CRM	QUI0154	$1,149

MiniMint – Portable payment system

Take credit card payments with your mobile phone

1. Boost your cash flow
Accept credit cards with your phone, instead of waiting for cheques to clear or account payments from your customers.

2. Cut bad debt
On-the-spot approval, decline & fraud detection with rapid settlement to your bank account means you won't have to worry about bad debt.

3. Save on administration
Record and report on all payment types to make tax time easier. Stop chasing payments to reduce administrative overheads.



WebCode: MIN1000



Reckon Retail Starter Kit 2008/09

The all-in-one POS solution

- QuickBooks Plus 08/09 QBi Series
- Retail Point of Sale Lite 08/09
- 12 Months free tech support and upgrades.

WebCode: QUI0162



ACT! by Sage 2009 v11

#1 Selling Contact Manager

Keep all your important relationship details for quick, organised access to the information you need.

WebCode: ACT0039

Embarcadero Change Manager

Automate database change management

Embarcadero Change Manager offers DBAs and developers a powerful set of tools to simplify and automate database change management. Its schema compare and alter, data compare and synchronization, and configuration auditing capabilities report on database changes, roll out new releases, and pinpoint database performance problems. 12 Months Maintenance included.



WebCode: EMB0001

FileMaker Pro 10

Manage People, Projects, Assets, and More

Whether you need to manage client information, track project details, or produce inventory reports, FileMaker Pro 10 helps you get your important information organized in one place so it's instantly accessible.

- **New!** Status Toolbar – Put commonly used features at your fingertips with the redesigned interface. Plus customise the toolbar with features you use the most.
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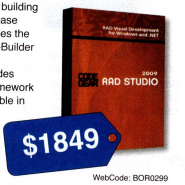


WebCode: FIL2500

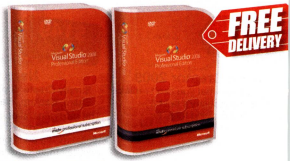
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WebCode: BOR0299



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WebCode: APP0449



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- 1.86GHz Intel Core 2 Duo
- 2GB RAM
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- 1280 x 800 Resolution
- OSX 10.5 Leopard

WebCode: APP0454



Apple iMac
Elegance and power

- 2.8GHz Intel Core 2 Duo
- 2GB RAM
- 320GB Hard Drive
- 256MB ATI Radeon HD 2600PRO
- OSX 10.5 Leopard

WebCode: APP0400



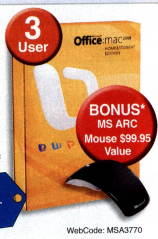
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WebCode: APP0451

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Save $40

WebCode: MSA3770



Microsoft Office 2008 - Mac
Perfect for business

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- Excel 2008
- Powerpoint 2008
- Entourage 2008
- Exchange Support

WebCode: MSA3773



Roxio Toast 10 Titanium Pro
Leading Mac burning suite

Compress, convert and compile videos as well as capture audio from any source. Burn discs on the Mac with a host of improved features

WebCode: ROX5011



VMware Fusion 2
Run Windows seamlessly on your Mac

Seamlessly run your favourite Windows applications and devices, on any Intel-based Mac.

WebCode: SMI0002



Bento 2
Personal Database by Filemaker

Now you can organise your important information and keep contacts, calendars, emails and events, files and photos-all in one place.

WebCode: FIL2098



Punch! ViaCAD 2D/3D
Leading CAD software for Mac

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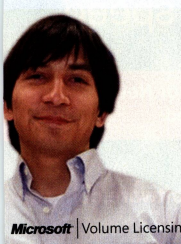
WebCode: PUN0027



Norton AntiVirus 11.0
#1 AntiVirus Software for Mac

Remove viruses automatically, clean infected Internet and email downloads.

WebCode: SYM9799



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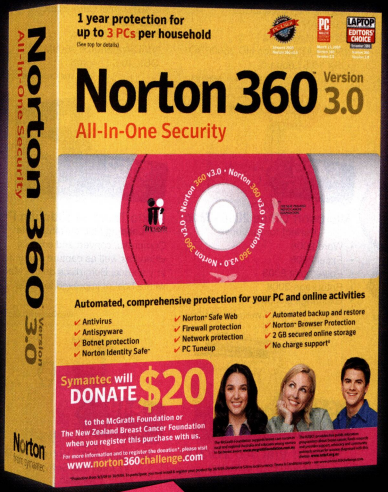
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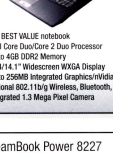
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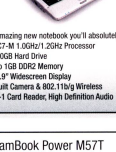


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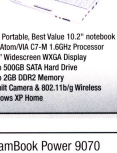


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DreamBook Lite IL4 (I'd love 4)

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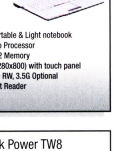


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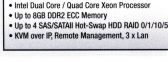


- Great value high performance workstation
- Intel CENTRINO 2 Dual/Quad Core Processor
- Up to 8GB DDR2 Memory
- 15.4" Widescreen WXGA Display
- nVidia GeForce Go 9600M GS-512MB PCI Express Graphics
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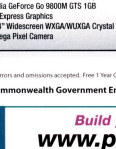


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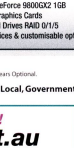


- Super high end and compact workstation
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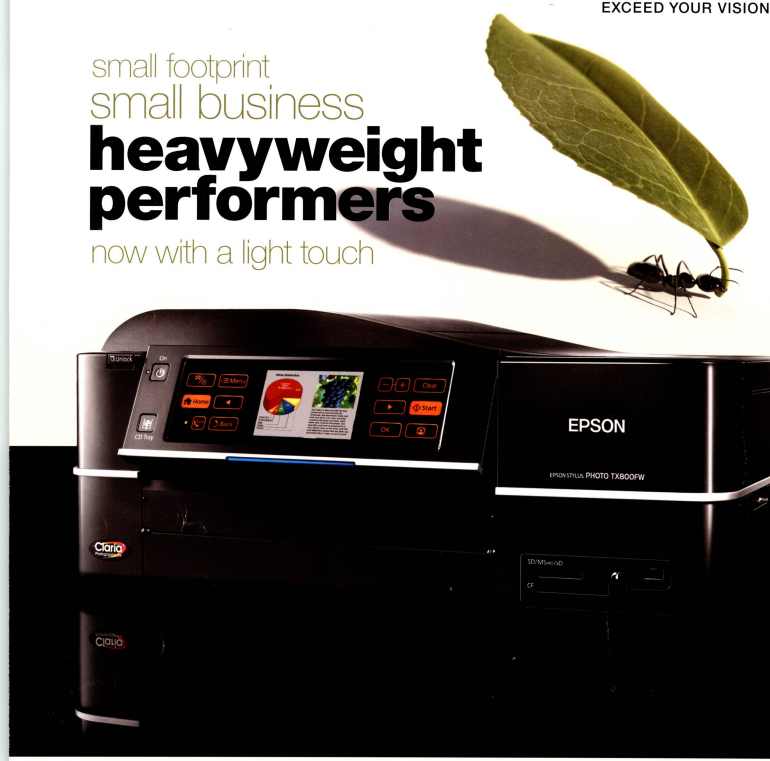
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